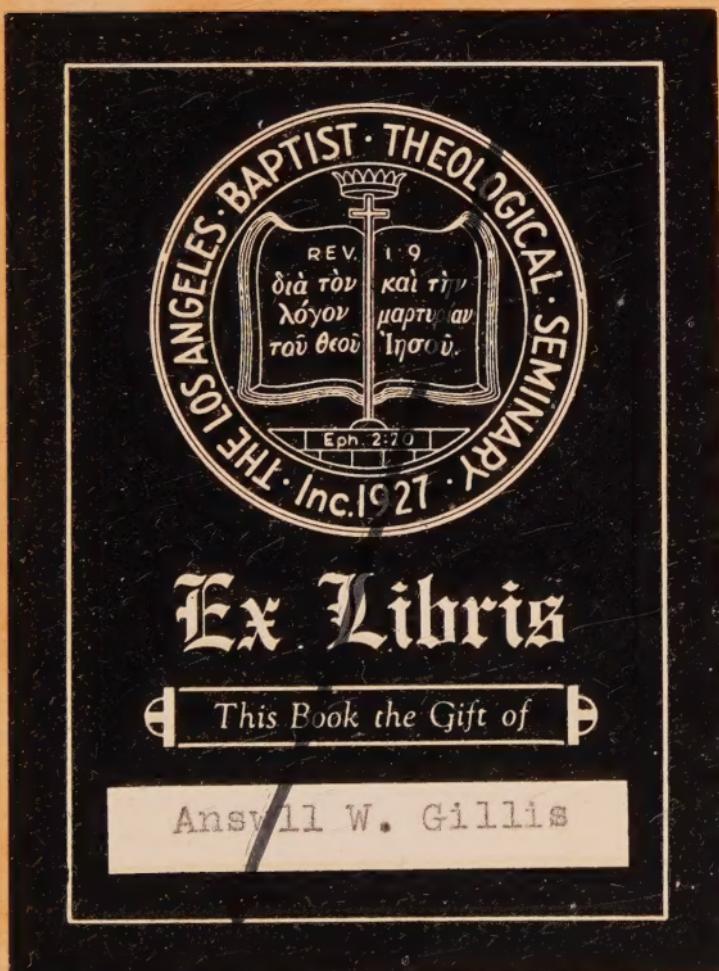


THE BANKRUPTCY OF EVOLUTION

HAROLD C. MORTON

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EVOLUTION



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THE BANKRUPTCY OF EVOLUTION

BY THE REV.
HAROLD CHRISTOPHERSON
MORTON, M.A., Ph.D.

Hold to the good: define it well:
For fear divine Philosophy
Should push beyond her mark, and be
Procureess to the Lords of Hell.

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FOREWORD

THERE is very great confusion in the mind of the British Public as to the whole subject of the bearings and truth of the Theory of Evolution. There is a large class which has a general acquaintance with the evolutionary idea, but has not read at all widely or closely. In that large class many questionings have long arisen, and few have found any answer to those questionings. What place Darwin aspired to in the history of evolutionary thought, what place he actually holds, and what is his particular achievement ; whether Darwinism is to be distinguished from Evolution or whether the two are to be taken as covering the same ground or even as identical with each other ; and, if they are distinguished from one another, what claim Evolution of some non-Darwinian type has upon our credence—all these are questions to which the average man of intelligence finds no answer forthcoming. Many Evolutionists, especially Darwinians, make the most sweeping claims ; whilst, at the same time, the leaders of research have for long been expressing doubt, and more than doubt, regarding this feature, or that, and the adequacy of the whole theory. Even professed and determined Darwinians make statements which *imply*

the rejection of Darwinism, and even the bankruptcy of the evolutionary doctrine of Descent itself. But meantime the theological works and handbooks, the volumes of the Higher Critics, and the Schoolbooks of the Elementary and Secondary Schools assume the universal acceptance not only of the Doctrine of Descent but of the Darwinian hypothesis of the method by which new species are derived from old.

What is the truth amid all these conflicting claims ? Did Darwin in reality unveil the secret of the Origin of Species ? What is the actual position of Darwinism in the authoritative scientific thought of to-day ? Has Natural Selection, or any kindred theory of any kind, any sphere of admitted and proven activity ? If not, what shall be said of the Evolution Theory regarded merely as a theory that by some method or other all living types, or species, have descended from some one, or more, original forms of life ? Is that theory, generally called the "Doctrine of Descent," scientifically established ? Or is its present prevalence due to a glamour with which, chiefly through the genius of Darwin, it fascinated the mind of Humanity ? Or if the Doctrine of Descent be rejected, does anything remain of historic Evolutionism ? And has the bare idea of so-called "evolutionary" change, what the Greeks called "the flux of things," any real value one way or the other ?

The answer to such questions can hardly be in doubt for the careful student of the position : and while the following Thesis does not make the slightest claim to original research, which indeed

does not fall in any way whatever within its scope, it does essay to answer these questions and also to indicate briefly the kind of influence which Darwinian Evolution, the only kind of Evolution with which the last two generations have greatly concerned themselves, has exercised and must of necessity exercise upon the movements of Philosophy.

As matter of fact the splendid outburst of research, which it was Darwin's glory to call forth, led nowhere. Darwinism is dead, and will soon be buried without hope of resurrection. But without Darwinism Evolution is the mere empty shell of a venerable speculation. Darwin is substantial, tangible, vivid flesh and blood; and without him Evolution is a vague shadow-form, an ancient ghost which haunts the hills of philosophic thought —only that and nothing more.

In the issue of this book my supreme aim is to remove the stumbling-block, and make it easier for the men and women of this generation to accept the Bible unhesitatingly as the Word of God.

THE CHALET,
CLOVER RISE,
TANKERTON,
KENT.

September, 1924.

CHAPTER I

A BRIEF GENERAL REVIEW OF THE GREEK PERIOD OF EVOLUTIONARY THOUGHT

THE word Evolution is in the scientific sense very modern, but the concept Evolution is very ancient and practically coterminous with the whole course of known European literature. Anyone curious enough to look up the word as used among the Romans will find that "evolutio" in common speech meant a "reading," and it had received that meaning from the necessity of unrolling the papyrus or parchment roll before reading the things written therein. The only shadow of approach to the modern sense of the word that can be discerned is that the unfolding of the roll came later to be used figuratively for the unfolding of an idea of the mind, the development of an idea. But in its scientific sense the word is absolutely modern. Dr. Johnson knew nothing of that sense when he wrote his Dictionary; and even Todd's edition of the Dictionary, a second edition "with additions" issued in 1827, knows no such meaning of the word.

But on the other hand the idea of Evolution has held a large place in the European mind for 2,300 years or more. Ancient Greek thought concerned itself very largely with the question, How has the

Universe come to be? Setting themselves to propound theories which would eliminate the divine from the programme of the Universe, they early conceived the ideas which in a variety of forms have been propounded by physicists and metaphysicians of more modern times. The repetition, after 2,000 years and more, of the ancient theories is one of the clearest illustrations which can be adduced of the idea of recurring cycles in the affairs of this globe. The early Ionian Physicists, Thales Anaximander and Anaximenes, propose the theory of spontaneous generation. They trace all life originally to the seas. Anaximander conceived the Earth at first as covered with water, which in part dried up, and then from the waters life appeared on dry ground. How far he was from modern knowledge of the order of life is shown in that he held the first living beings to be produced on the Earth were men, who had been as fishes in the sea and emerged as soon as they were able to sustain their life on land. Man's long helplessness at birth showed Anaximander that he cannot be in his original condition.

Anaximenes apparently was the thinker who gave a more tenable form to these early speculations. He believed air to be the causative agent, which acting on primordial slime (compare "fucus slime of waste sea shores") with the aid of the sun caused all forms of life to spring forth. This original "matter" had within itself as an inherent quality the power of generating varied forms of life and then transforming them. It is indestructible, and nothing further is required both to

account for the varied forms of life and to maintain the Earth in a continual state of transformation. There is a singular ring of modernity in his conception of this original matter as being homogeneous (to *apeiron*) and as being in some unknown manner developed into the successive forms of the Universe that now is. Again, this primordial matter, regarded as animated and thus giving rise to mental as well as physical forms of life, was strongly advocated by Diogenes of Apollonia. In all this we can see at once the essential concepts of many modern development doctrines; and it is thus plain that the view of the world not as static but as in a continual state of flux was from its commencement the dominating view of this early European thought. That idea—which we call the evolutionary idea—is the idea of the world as always coming to be something different; not a world as it Is, but a world ever changing into something new. It is always becoming a new world; and those special periods which we speak of, say in human history, as periods of such change that Humanity entered upon a new life, differ from all other periods only in this—that some change in human conditions greatly speeded up the movements which are always taking place. This concept of the world as *Becoming*, ever *Becoming* something new, is a concept originated by the earliest known Greek thinkers.

Greek thought rang many changes on the bells of time, and modern philosophic as distinct from scientific thought has done little more than repeat the chimes. It is worthy of note also that the other

ancient branch of Aryan thought, viz. Indian Philosophy, is of the same character as Greek Philosophy, and assumes an original uncreated eternal Matter, itself creative in its power, from which all existences both material and spiritual proceed. This creative primal "Matter" is also depicted as the "World-Soul," Brahma, whose unfolding seems to partake of the character both of Emanation and also of Evolution. But the modern repetition of the ancient chimes is again seen in the case of the Eleatic Philosophy which followed upon the Ionian. The Eleatic philosophers were metaphysicians of a very determined character, denying all reality in the illusory impressions of the senses, and therefore also the whole reality of evolutionary change. So that just as we find in our most modern thought the early Ionian conception of a primordial matter, containing within itself a native force which necessitates continual change in the forms of existence, so too we find in all the Idealist philosophers the repetition of the Eleatic idea of the unreality of all that exists in the realm of sense. Leibnitz repeats the Ionic conception of primordial matter: Hegel repeats the Eleatic proposition that the only Being is Thought. The peculiar Hegelian idea of the antinomy of thought was also anticipated dimly by the metaphysician Heraclitus. He conceived that there are two antithetical thought-forces at work, viz. generation and decay, both always active; and the clashing of these produces the transition from one form to another. Existence and non-existence he conceived as not mutually exclusive but mutually involving one another;

inasmuch as everything which comes into being embodies these two contrary forces—Generation bringing into existence, Decay bringing back to nothingness ; and the two, in their hostile union, bring to pass the Becoming of the world.

The conception of the primordial Matter, as alive with impulse toward Generation and Change, persists down the whole course of Greek evolutionary thinking ; and at the same time other ideas are put forward which also find their resurrection in modern evolutionary theory. Empedocles, a man of more scientific cast of mind than his contemporaries in general, is sometimes referred to, with more enthusiasm than correctness, as the Father of the Evolutionary Idea. He believed that all things come to be, not by the transformation of some primitive form of matter but by the varied combinations of a fixed number of ultimate elements. He suggested that the combinations of these elements are produced by forces in the elements themselves, which, under the names of "love" and "hate," seem to be the familiar modern forces of Attraction and Repulsion. Thus Empedocles gave a mechanical explanation of the Becoming of the world, regarding even Mind as a property of Matter, and thus also as being called into existence and consciousness by the same mechanical processes which account for the shaping of the world. Many of the ideas of Empedocles have a very modern ring, though some are very crude. Upon the four Elements—Air, Fire, Water and Earth—played the forces of Attraction and Repulsion ; and thus by spontaneous generation all organisms arose. But

the lower forms first, and plant life preceded animal, and all was very gradual. Empedocles is reported to have given special attention to Embryology, and taught that animals arose first not as composite individuals but in parts—i.e. heads without necks, arms without shoulders, eyes without sockets. Thus it came about that under the force of Attraction monstrous forms arose, and perished because not able to reproduce themselves! Aristotle refers to Empedocles as being the first to show the possibility of the origin of the fittest forms of life by chance and not by design, since he argued that only those forms able to support themselves and reproduce their kind survive. This theory of chance and not design Aristotle controverts.

Leucippus and Democritus carried the theories of Empedocles to a further point. They formulated the Atomic Theory, holding that the elements which by their attraction and repulsion form the ordered Universe, themselves consist only of Atoms, which have the properties of magnitude, shape, weight, and hardness: and whereas Empedocles said that Mind was a property of matter, Democritus identified Mind with that property which we call heat or fire, which was, he believed, stirred into activity by effluvia from outside entering into the organism, and that activity is the cause of Sensation.

Plato represented the rebound from this mechanical and atheistic theory of Origins back to the Supernatural, as the necessary ground for reasoned belief as distinct from mere speculation. But Aristotle, while in some measure the follower of Plato, is the really great name in ancient evolu-

tionary thinking. He adopted the theory of primordial matter, i.e. the germ or soft mass which first subsisted, containing the vital impulse within itself: yet Plato's influence is mighty and leads him to strongly teleological views. He believes that the Divine Thought is being realized in all the processes of the world's Becoming, that the process begins by developing fixed and unchanging species, and ends with the fore-ordained end, viz. Man. He found nothing but vague speculation before him. He said: "I found no basis prepared; no models to copy. Mine is the first step, and therefore a small one, though worked out with much thought and labour." As a boy he roamed on the seashore, and drew his ideas from the gradation of marine plants and the lower and higher marine animals. "He was the first to conceive of a genetic series; and his conception of a single chain of Evolution from the Polypus to Man was never fully reproduced till the beginning of this (i.e. the last) century" (Osborn, "From the Greeks to Darwin," p. 44). Aristotle perceived many things in his nature researches which have been rediscovered in our time: e.g. the multiplicity of Species; the principle of Adaptation, believing that the various organs were fashioned because they became necessary, and in the order in which they became necessary; the distinction between homogeneous tissue, made up of like parts, and heterogeneous organs, made up of unlike parts; the unity of type or plan in certain classes of animals, rudimentary organs being tokens whereby Nature sustains this unity; Life, not as a separate principle, but as a function

of the organism ; hereditary transmission, the pre-potency of the "stock," and also Reversion or Atavism ; the rarity of the inheritance of functional modifications, or of mutilations ; and he also anticipated Harvey's doctrine of Epigenesis, i.e. "the successive differentiation of a relatively homogeneous rudiment into the parts and structures which are characteristic of the adult" ("Encyc. Brit.," Vol. VIII, 744 *b*).

He believed Nature to represent a gradation of forms of life from the most imperfect to the perfect, that the transitions were gradual owing to the resistance which Matter offers to Form : that Nature by an inherent perfective principle is always striving after the most beautiful : and while he referred to Matter as a *Material Cause*, the perfecting principle as a *Formal Cause*, the good of each and all as a *Final Cause*, the *Efficient Cause* or Prime Mover is God. How very plainly all this reminds us of the controversies of our own day ! Aristotle, however far some of his conceptions differ from certain modern views, is unquestionably evolutionary in his thinking and "scientific" in his efforts to establish the evolutionary theory ; while his view of history as a social progress, arising from the play of natural forces, is the very view from which the modern evolutionary movement springs.

Anaxoragas believed, as Aristotle did, that adaptations show intelligent design ; he traced plants to germs originally existing in the air, and animals to germs originally existing in the ether ; but his "germs" are really miniatures, in which

all parts exist from the beginning. Strato was a disciple of Aristotle; but the naturalistic view, which seems almost to be inherent in Evolution, reasserted itself in him. He cast over the plea for a source of life and movement outside the world, viz. God, and thought it truer to posit the concept of the early Ionic philosophy, the vital primordial Matter containing all that is necessary to its own Becoming within itself. Finally there came Epicurus, whose main object was to eliminate the supernatural, and T. Lucretius Carus, a Roman but, like most others, a follower of the Greek evolutionary schools. He is the typical Epicurean in his evolutionary philosophy. The Epicurean accepted Democritus' Atomic Theory, but recognized that there was need for Motion as well as Matter to be granted if an account is to be given of the Origin of the world. Therefore he assumed an original mysterious vertical movement of the Atoms, till by chance one Atom moved out of its vertical line, and the resultant ceaseless jostling of Atoms accounts for the ever-changing forms of the organic and inorganic worlds. All seeming intelligent adaptations in Nature are only special cases of the infinite chance possibilities of mechanical arrangement. The organic is finer in its constituents than is the inorganic, he believed; and mind is only extremely fine particles of matter. Lucretius pictures the ordered appearance of vegetable and animal forms out of the earth, a struggle for existence in which some survive and some perish, and the gradual rise of language, religion, and the arts. With Lucretius, ancient evolutionary speculation reached its climax

and appropriately clothed itself in the robe of poetry: and thereafter there followed that great gulf of time, almost empty of evolutional thinking, which separates ancient from modern days.

CHAPTER II

THE DIFFERENCE BETWEEN THE ANCIENT AND MODERN EVOLUTION MOVEMENTS

IHAVE given much space to the early Greek evolutionary theory not only because it was a very wonderful forecast of modern science and philosophy, but because the greatest claim of the Evolutionary Theory to our respect is its extraordinary dominance in the two greatest creative periods of humanity's secular thought. All this Greek speculation has been reproduced since the Renaissance in what may quite fairly be called the old chimes rung again—although the general absence of the cruder notions of the Greeks must in fairness be noted.¹ But there is a great out-

¹ But we have not been without similar crudities even in modern times. Take, for instance, the following two instances which Samuel Butler gives in the little collection of his "Savoyard" and other letters, in the MS. in the British Museum Library. They concern the two Darwins, Erasmus and Charles. As an extraordinary instance of the wild mechanical guess which used to be regarded as admissible in the realm of "life evolutional," it would not be easy to beat this, from Erasmus Darwin's "Botanic Garden" :—

"I am acquainted with a philosopher who, contemplating this subject, thinks it not impossible that the first insects were

standing difference between those times and our own, which reached its culminating point in the devoted work of Charles Darwin. That difference is the closer study of Nature to which the Renaissance gave rise. When all that can be said for ancient Greek Science has been said, that fact still stands out clear and strong. It is true the wonderful correctness of idea in so many of the speculations of the Greek philosophers inevitably leads one to surmise that there may have been a great deal more observation and experiment and a far more exact knowledge of Nature than we have as yet credited to the ancient Greeks. The assumption of a fixed number of ultimate elements, the Atomic theory, the knowledge of Attraction and Repulsion as forces anthers and stigmas of flowers which had by some means loosed themselves from their parent plant, and that many insects have gradually, in long process of time, been formed from these; some acquiring wings, others fins, and others claws from their ceaseless efforts to procure their food or to secure themselves from injury. The anthers and stigmas are therefore separate beings."

Or again, Butler quotes Charles Darwin himself, viz. a comment of Darwin's on the fact that Hearne saw in North America the black or beach bear swimming about for hours in the water of the sea with widely open mouth, thus catching insects in the water, almost like a whale. Butler quotes Darwin as saying :—

" Even in so extreme a case as this, if the supply of insects was constant, and if better adapted competitors did not already exist in the country, I can see no difficulty in the race of bears being rendered by Natural Selection more and more aquatic in their structure and habits, with larger and larger mouths, till a creature was produced as monstrous as a whale."

This is exactly Darwinian in style—" if," " if," " I can see no difficulty"—and this also is an extraordinary instance of the crudest theorizing.

of Nature, the contention that everything in the known Universe can be accounted for by the interplay of Matter and Motion, the perception that the various forms of being and life are due to various combinations of the ultimate particles of the elements—all these are conclusions which meet us in the course of the modern movement; and it is difficult when we recognize the ancient ideas in their modern expression not to surmise that the scientific life of the ancient time had a certain similarity to the scientific life of modern years.

Yet when all is said the modern movement has undoubtedly for its most important characteristic that close study of Nature, and accuracy of observation, which sought to bring Evolution out of the vague mists of speculation and to root it in the actual facts of the organic Earth. At first the evolutionary thought of the modern period, ushered in by the Revival of Learning, for the most part merely repeated in varying ways the speculations of Greece. It is true that men like Lord Monboddo introduced detail into their theories. Monboddo traced what he conceived to be the rise of Man from an animal ancestry, through the gradual increase of his mental endowments, till he reached the social state in which he lives to-day. But the greater names, like Leibnitz, represent the re-birth in modern language of the old Greek metaphysics and physics. Leibnitz's Monads, in their infinite array, mental as well as physical in their character, and with the essential quality of active force necessitating continual movement within the Universe, are in the direct line of Greek thought, not only in the con-

ception of the ultimate character of the constituents of the Universe but also in the purely speculative character of Leibnitz's thinking. Emanuel Kant reproduces the Stoic conception of the Universe in a state of flux, with the worlds and systems which compose it first formed by mechanical laws and then by those same mechanical laws destroyed: but it should be added that when he turned from the realms where all human thought must needs be speculation only, to the realm of organic life which men are able to observe and investigate, he is the disciple of Plato in his essential concepts and the foe of the whole plan of Evolution. The speculative intellect of Schelling was in reality playing upon the earlier Greek conception of a primordial material of Nature which had the inherent power of movement and expression and was endowed with qualities both material and mental. The great name of Hegel stands in reality for the re-birth of the metaphysics of Heraclitus. Hegel conceives of the problem of existence as a problem of Becoming, or in other words as an evolutionary problem. Heraclitus' conception of the two forces, viz. of Generation and Decay, which in their conflict produce all the changing forms of the Universe, in such a manner that he could identify Existence and non-Existence because everything that exists is always passing out of itself into something other than itself, and nothing that exists is ever static, is the conception which we can trace in Hegel's concept of the essential antinomy of thought. His perception that the process which we call Thought *is* a process—that Thought involves within its very

nature perpetual movement, a perpetual movement whose very essence is contradiction, so that Thought is always moving out of itself upon its opposite and then returning upon itself—this perception gave to Hegel an intricate and vast conception how this world, which has existence only in Thought, came to be what it is. So far as speculative and metaphysical thought is concerned, Hegel registers the first real advance of modern over ancient thinking inasmuch as he can claim that if the Pure Idealist position is granted he has left the realm of speculation and entered into the realm of reality by unfolding *the necessary movement and process of Thought*.

It was Auguste Comte whose intense revolt from the merely speculative turned men's thoughts to the more fruitful fields of observation and experiment into which Bacon had so long called them. Comte's Positivism restricts all inquiry to phenomena, forswears causes, and contents itself with the laws those phenomena reveal. Comte, however, gave no aid to evolutionary theory save by his emphasis upon human development as moulded by the nature of humanity itself and the influences which have descended upon us from all the past. From whatever source Darwin obtained his idea in the first case, there is no question that the immense vogue of the evolutionary idea in modern times takes its rise from the investigation of the facts of Nature, and from the resultant claim that the forces which have guided the whole course of organic change had been ascertained. It should also be noted that there has been great progress in other

realms, beside the organic. "Cosmic Evolution" has been the scope of the evolutionary idea from the first; and there has been *movement* in every realm for the consideration of the scientist and philosopher. Astronomy and the origin of the heavenly bodies: Geology and the gradual formation of the crust of the Earth: Chemistry and Physics, leading to the vast generalization of the Conservation of Energy, to the knowledge that the chemical constituents of the Earth and of the heavenly bodies are the same, and to the knowledge also that the organic and inorganic are chemically akin—in all such directions knowledge has wonderfully increased and the term evolution is applied to the ascertained processes which have led to the present position of the Universe. In these directions it is only perhaps in a very vague way the term "evolution" can be used. In the organic realm alone is its use more precise and definite. In a clearly evolutionary sense Tennyson cried out:—

Yet we doubt not thro' the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns.

So with the process of the suns the thoughts of men are widening, and Psychology is making rapid progress, especially in the endeavour to trace the processes by which the mental powers are unfolded, as revealed in the study of the mind of the Child. And, moreover, that great sphere of true evolutionary activity the body politic, the movements of Social Life, shows great progress; and men

never had such reason as now to anticipate Tennyson's vision :—

All diseases quenched by Science, no man halt or deaf or blind ;

Stronger ever born of weaker, lustier body, larger mind.
Earth at last a warless world, a single race, a single tongue—
I have seen her far away—for is not Earth as yet so young ?
Every tiger madness muzzled, every serpent passion killed,
Every grim ravine a garden, every blazing desert tilled.

But while the term “ Evolution ” is in these spheres more or less justified, the claim which gave to the theory its immense modern vogue was that in the realm of organic life, i.e. specifically in Biology, the processes of Evolution had been actually traced out.

So it is there, in the realm of organic life, that the new and supposedly stronger basis was laid for evolutionary theories to rest upon. On the one hand the study of anthropology, history, and the whole realm of human movement and progress : and on the other hand the study of the lower forms of life, the life of the cell, the life of the plant, and the life of the animal—these studies have been the great characteristic of the modern evolutionary movement, and its great vogue in the limited sense as an explanation of the Becoming of the varied forms of organic life dates from the attempt to carry out exact and limited research on strictly scientific principles. The name which is pre-eminent in this respect is the name of Charles Darwin, but it would be a great mistake to shut Darwin off in a watertight compartment from his predecessors in the field of evolutionary research. One need

only read the Historical Sketch at the beginning of "The Origin of Species" to realize that Darwin entered into a considerable inheritance of scientific thought, more or less upon his own lines of investigation. Darwin does not mention Harvey, who not only possesses great fame as the discoverer of the circulation of the blood, but also deserves great fame as the expounder of the theory advanced by Aristotle that the formation of the body of the higher animals does not take place by the sudden arraying side by side in their due relation of the various rudimentary organs which are developed in the adult, nor by a sudden change of the generative substance into a miniature of the whole body that is to be, but by Epigenesis, i.e. "the successive differentiation of a relatively homogeneous rudiment into the parts and structures which are characteristic of the adult" ("Encyc. Brit.", Vol. VIII, p. 744). Darwin also sets on one side Buffon, "as his opinions fluctuated greatly at different periods, and he does not enter on the causes or means of the transformation of species" ("Origin, etc.", p. xix.). But he pays a generous tribute to the labours of many others. Lamarck, he says, "seems to have been chiefly led to his conclusions on the gradual change of species by the difficulty of distinguishing species and varieties, by the almost perfect gradation of forms in certain groups, and by the analogy of domestic productions. With respect to the means of modification he attributed something to the direct action of already existing forms, and much to use and disuse, that is to the effects of habit." Darwin proceeds to recognize the services to the

same conception of evolutionary progress of Geoffroy St. Hilaire, Dr. W. C. Wells, Von Buch, Prof. Halde man, Prof. Owen, Herbert Spencer, T. H. Huxley, and other writers. He gathers into his plan ultimately all the valid ideas of his predecessors, and seeks to lay a firm basis for the origin of species by means of Natural Selection, or the preservation of favoured races in the struggle for life.

This somewhat drastic restriction of the scope of evolution—that is, the supposed basing of the theory upon definite scientific research especially in the realm of biology—led to the rapid spread of the doctrine. Moreover, not only by this restriction did Evolution “stoop to conquer,” or in other words restrict her scope in order to gain firm footing in the realm of thought, but that restriction has been itself after a little time laid aside. For, taking the results of mankind’s selection in the realm of plant life and in that of domesticated animals as typical results, and arguing from analogy, they have reasoned regarding the accumulation of variations, and have thus arrived at Species, Genera, Families, Orders, Classes, in the whole realm of organic nature: and have then proceeded, resting upon “the principle of uniformity,” to assume the same processes of variation and accumulation to have been at work all through the vast geological periods of time. Thence they have proceeded to a further assumption, viz. that the processes of change which have been traced in the organic world, and inferred by reasonable analogy where they cannot be traced, have also been at work in the vast realms of the inorganic, and the evolution

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of the Earth and all worlds has taken to itself an unwonted character of verity because of the firm foundation claimed for the evolutionary concept in the realms where research has been actually carried through. Thus has the theory of Evolution come to hold the great place in human thought which it has to-day, and the speculations of the Ionic philosophers seem to have been crowned by the brilliant researches of Charles Darwin.

CHAPTER III

THE LINES OF THOUGHT WHICH HAVE LED MEN TO THE EVOLUTIONARY VIEW OF THE WORLD

IT is not easy to array the lines of thought which originally led philosophers to speculate along the lines of evolutionary theory. We meet the conception of Evolution in the thought of the ancient races of the Indian Peninsular, and we meet it also, and much more clearly, in the thought of the Greek peoples. Any attempt at explanation of the origins of this thought must needs be largely of a speculative character; yet there is so real a similarity between the members of the human race in all ages that we may venture to surmise that the movements of thought to-day and the movements of thought in days far off, which resulted in identical theories, were in many respects the same. There is no doubt that evolutionary thought to-day is in some measure a revolt against what is felt to be the narrowing and hampering conception commonly called "Creationism," and the Creational teachings among mankind far antedate the Greek evolutionary speculations and probably the Hindu pantheistic evolutionism as well. Babylonian creation tablets show very clearly that 2,000 years before Christ there was the definite conception of

the world as created; and the Biblical account, so like the Babylonian and yet so superbly superior to the Babylonian mythological presentations, probably dates from the same period, the time of Abraham, or perhaps a period even earlier than that. That the enterprising Greek peoples, who had their legends of war in Asia, showing contact with that continent long before the period of philosophical development, who also had immeasurable intellectual curiosity to spur them on, were in ignorance of the Babylonian and yet more of the Biblical teachings, is quite unthinkable. For example, round about 400 B.C. we find Greece entering into the disputes and warfare between Egypt and the threatening Persian Empire, which included within itself all ancient Babylonia and the land of Palestine. But 800 years before that, round about 1200 B.C., we find leagued together against Rameses III of Egypt a striking array of Allies, including Greeks of the *Æ*gean and various races of Asia Minor. "The coalition of foes was gathered from a strikingly wide area, revealing how intimate were the relations subsisting in this early age between the various peoples of the Mediterranean basin, maritime and otherwise. In the league were Libyans from North Africa, Philistines, Teukrians from Crete, Greeks from the *Æ*gean, Sardians and other peoples from Asia Minor, tribes from Seir and Edom, Bedouin Nomads and other wandering races. But Pharaoh gained the day" (Knight, "Nile and Jordan," p. 254). It is incredible that the Greeks were ignorant of the Creation accounts, and knowing humanity as we

do, with its age-long revolt against the teaching of Theism, we may well believe that the evolutionary philosophy had that revolt as one of its initial impulses. As a matter of fact this revolt against Theism, the effort to get rid of the supernatural in the account of origins, did appear very plainly in Greek thinking: e.g. in the philosophy of Empedocles, who shows how the "fittest" forms of life may have arisen by chance and not by design, or in the philosophy of Epicurus, whose great object was the elimination of the supernatural. Indeed, all down the line of evolutionary thought the greater part of natural philosophers have held that chance, not law, has directed the course of evolution, says Dr. H. F. Osborn, quoting as an instance G. R. Davies: "And why not? Nature has always preferred to work by the hit or miss methods of chance." To get away from the supernatural and display the needlessness of God has undoubtedly been one of the impulses which have driven mankind so largely along the evolutionary paths of thought. Prof. H. F. Osborn, one of the very protagonists of Evolution to-day (though he admits that "the old paths of research have led nowhere"), says frankly, "from the period of the earliest stages of Greek thought man has been eager to discover some natural cause of Evolution and to abandon the idea of supernatural intervention in the course of nature" ("Origin and Evolution of Life," p. 9): and when he himself speaks of Law directing Evolution he only means some principle contained in organisms, an evolution by resident forces, and says: "We may first *exclude the possibility* that it

acts either through supernatural or teleological interposition through an external creative power" (p. 10). Like most of the ancient Greek evolutionists he believes in some sort of spontaneous generation of life. All thinkers have to reckon with this strange bent of the human mind to convince itself of the needlessness of God.

Moreover, no candid mind denies the difficulties of Creationism, even if it tenaciously holds to that view as the true one when rightly interpreted; and one of the difficulties which Creationism has to face is that the world as we know it is not *static*, and Creationism has generally been interpreted to mean a static world. It was once fixed and fixed for ever. Quite unjustifiable statements are sometimes made depicting Nature as static. For example, Mr. Philip Mauro, in his otherwise excellent brochure "Evolution at the Bar," declares:—

"From these facts it must be concluded that, if there were any evolution in those realms of Nature which are not under the guidance and control of the will of man, there would be abundant evidence of its working in those spheres also. The only sufficient reason why things in Nature *appear* to be at a standstill, and have so *appeared* during the thousands of years they have been under Man's observation, is that they *Are* at a standstill."

Such a statement is so contradictory to numerous facts in the realm of the inorganic, such as changes in the heavenly bodies, in the Earth's surface, and chemical changes—and also to numerous facts in the organic world, such as the emergence of many diverse Variations in innumerable directions—that one must admit it to be untenable. The facts

of *movement* in all realms accord equally with human observation and with the declaration of the Divine Founder of Christianity, when He was accused of breaking the Sabbath which commemorated God's rest from the first great creative acts, " My Father worketh even until now, and I work." It is quite clear, therefore, that on a Biblical basis rest from the first acts of creation does not involve the cessation of all change.

Beyond all question the world in very many directions is *not* static, but in process of Becoming, i.e. in continual process of change. Confronted with this continual change in the starry realms above us, in the world of inorganic nature, and in the world of life all round us—and, most emphatically of all, with continual change in the order of human life itself—man conceived " that general idea we now more or less share of the Universe as not only orderly but in process of change. Changing order, orderly change, and this everywhere, in Nature, inorganic and organic, in individual and social life. . . ." (" Evolution," Thomson and Geddes, Introduction, ix). The world does not seem to be fixed in its forms but always becoming different, and evolutionary philosophy was the answer of the speculative mind to the question, How ?

Indeed, from this general statement there are two particulars which need to be singled out for special emphasis in any account of the genesis of evolutionary thought. The first is this: that everywhere in organic nature the forms of life are evidently arrayed in ascending order of development and complexity. Such succession does not for one

moment necessarily imply derivation or descent: but we must needs admit the succession of organic life, which is equally clear from Scripture and from scientific investigation. This must always have been evident to the observer. From the minutest creatures of the Earth and those of lowest organization up to the highest and most complex, there is a scale of ordered life. Professors Thomson and Geddes state this fact in a way that is hardly to be excelled:—

“ Some reckon that there are over a million different species of living creatures, and, in any case, there are many myriads. Now these species are, in many cases, linked together by varieties which make strict severance difficult. They are like constellations, well defined at first glance, which on closer inspection are seen to be connected by outlying members of adjacent constellations. Moreover, they can be rationally arranged in genera, orders, families, and classes: yet between these there appear to be not a few remarkable connecting links: there is structural progress from the unicellular organisms upwards along various lines of organization: and it is possible to make a provisional genealogical tree which is becoming less and less shadowy every year, though the mutual relations of the larger branches are still very obscure. A practical study of the species of plants and animals, and of the way one category of classification includes those beneath it—classes, orders, genera: genera, species: species varieties: and varieties, individuals—gives us ‘ an impression of affiliation ’ which we do not get from a classification of rocks or other inanimate objects. It is impossible not to feel in biological classification the suggestion of pedigrees and heraldry.” (“ Evolution,” pp. 46 and 47.)

Without for one moment suggesting that this far-reaching statement could have been penned by

Anaximander or Empedocles, it is yet clear enough that some such scale of being must have been perceived by the observers of that early day and must have been one of the special originating factors in evolutionary thought.

The second particular which demands special emphasis is also one which may well have been a great factor in those early days, just as it has undoubtedly played a most important part in the modern revival of the evolutionary conception : viz. the progress in social life. It has often been laid to the charge of Charles Darwin that he made his observations in the realm of plant and animal life and then having deduced his principles applied them to the realm of Humanity. But the opposite order of procedure is actually correct. The observation of human life by Rousseau, Malthus, Comte and others (including Hobbes), revealed certain advantages enjoyed by certain nations which thus forged ahead of the rest in "the battle of life": and turning from human affairs, where the struggle for existence and survival of the fittest had first been observed, Darwin thought he discovered the same forces at work in plants, insects and animals, to the same end. Profs. Geddes and Thomson return again and again to the same position, viz. that modern evolutionary philosophy takes its rise from observation of the progress of human society. The illustrations of Herbert Spencer are drawn from this particular realm in a very notable measure: and while this feature cannot be discerned in the same abundance in Greek thought, yet Aristotle's theories as to the origin of human society and government,

as a growth resulting from increasing necessities, suggests that observation of the changes in human society may have played, among the Greeks, a part that is real even though not commensurate with that played by it among modern evolutionists.

CHAPTER IV

THE STRANGE POVERTY OF EVOLUTIONARY THOUGHT DURING 2,500 YEARS

SUCH, then, are some of the lines of thought which have led men to the evolutionary view of the world. But when one allows the mind to range over these two millenniums and more from the Greeks to Darwin and his followers—two and a half millenniums, which include the three great outbursts of the secular intellect in the course of human history, viz. the Golden Age of Greek literature, the Revival of Learning, and the modern period, that latest century of such wondrously varied achievement—one can only stand amazed at the poverty of evolutionary thinking. For Evolution has been for the most part nothing more than a vague idea, looming up large in a mist of human speculation, to which vague intangible idea only two men have succeeded in giving any measure of definiteness. These two are Hegel, who “lived, moved and had his being” in the world of Metaphysics, and Darwin (including his immediate predecessors) in the field of science. Two thousand years of human thought have produced only two suggestions as to *the method* underlying the process of Becoming or Continuous Change. The one is the method of Hegel, and the

other the method of Darwin—it being understood that Darwin took up into his theory and vivified the main ideas as to *method* suggested by Buffon and Lamarck. Two and two only! It is true that Prof. Kellogg refers to the theory of Mutations as though this were an alternative theory as to method. But a Mutation is a big Variation which comes into existence and persists no one knows how: and to say "Species have originated through Mutations" is merely to say "We do not know *how* Species have originated." Again, Prof. Kellogg names Orthogenesis as another theory of the Method. (Kellogg, "Darwinism To-day," p. 5.) Now, Orthogenesis is variously spoken of by its advocates as "an inner directive force," "an inner law of development," "an intrinsic tendency toward progress." (Kellogg, p. 278.) It is akin to Aristotle's "perfective tendency," to the various conceptions called Vitalism to-day, and to what some more poetically speak of as "the urge of the world." Something in the organism (or behind it) causes its variations to move onward in a straight line, quite independently of any external influences or advantages accruing. But this is not a method of the World's Becoming! It is a vague theory which does not even attempt to define a method. It only says that "Changes are being effected by a force which is effecting them"—and that leaves us quite without understanding of the movements of the world. There are only two explanations which 2,500 years have offered: Hegel's intrinsic thought process, and Darwin's Natural Selection. It reveals a most singular poverty, which is well calculated to give pause to

those who contend that the great final conception of progressive thought is the theory of Evolution. If there be any partial exception to this statement that only two suggestions of method have marked 2,500 years of thought, that exception is Aristotle, who confessed that he was only making a beginning and had no fore-runners in his scientific procedure, whilst History shows that he had no followers until our own immediate day. But though he did much to prepare the way for a theory of the method of evolution, he never did formulate any theory, nor did any Greek after him. The evolutionary philosophers who followed him turned away from his scientific research and got back again to the vague evolutionary speculations of the thinkers who preceded him.

This poverty of thought as to the method by which the evolutionary change is brought about is all the more remarkable in that the mere vague concept of Evolution is, of itself, of no very great value. It is definiteness of conception as to the cause or method of the changes that are brought to pass which indicates the trend of the movement and gives practically the whole value to the evolutionary idea. This is one of the lessons which the modern scientific movement has taught us. It lays the utmost emphasis upon exact observation and precise knowledge ; and the fact that men concerned themselves with philosophical ideas instead of the concrete facts of Nature and Life is the great explanation of the long halt of two millenniums, during which human brains in this respect merely marked the time set at the beginning. The general

idea of change in cosmic and human affairs: the affirmation, "There has been change, and in some manner we cannot fathom, that change has been ordered change": this idea and affirmation formulate merely the first step in thought regarding origins and processes of Becoming. The next steps concern the *method* of change. The stairway may be short or may be long. No one knows, for mankind has not yet explored it. For two millenniums thought has halted on the first step, save for Hegel and Darwin, who have laboriously stepped upward. Whether they have planted their feet upon the second rung or have halted mid-air without reaching a solid resting-place, is a matter which has been for many years in dispute between the thinkers of the world, but now may be fairly described as settled.

What, then, are the two methods proposed? Few evolutionists, instinctive and determined Realists as scientists can hardly fail to be, concern themselves with Hegel's solution of the problem. But at least Hegel regarded the problem of the world from a truly evolutionary point of view. The problem for him is one of Becoming: and, granted his Idealist standpoint as the true standpoint, Hegel's solution of the problem is logical, definite and compelling. Hegel is a Pure Idealist. Kant, for example, allowed the existence of a Substance external to the thinker, although that substance remains for us eternally unknowable. But with Hegel Substance entirely disappears. The one real Existence is Thought. Thought and Being are identical. Being and Knowing *must be* one and identical. Thought alone is real. Everything pre-

sumed to exist outside Thought is mere illusion, however real illusion may appear to be. It was the business of Philosophy, according to Hegel, to present Thought as it is in Itself, comprehending in itself the Universe, and presenting it in consciousness as the Intelligible World. Philosophy presents to us Thought begetting the whole "objective" world out of Itself.

The all-dominating principle of Hegel is this: Thought is the one Reality. But Thought is no static thing. Though it is not to be regarded as itself existing under the "species" of Time, yet Thought is a *process*. It is essentially a movement; and this essential movement of Thought creates for consciousness all the ceaseless movement of this illusive objective world. In Thought every Affirmation is Negation. Every thought or notion has, *within itself*, the opposite or negation of itself. Thought no sooner affirms a notion than it passes out into the negation of that notion, and back again upon itself—and the result of this movement is a new notion, a new notion richer than the original by virtue of this very process of negation. Thus Thought affirms itself as Subjective, to take an illustration. It is impossible to do this without passing out at once to that which negates the Subjective, viz. the Objective. The outward movement at once returns upon itself, creating thus the notion of subjective in union with objective—a far richer notion than the subjectivity posited at first. Or, to take another illustration, Thought posits the unit, viz. one; and cannot possibly do this without passing out of that notion into the notion of plurality,

viz. many: and then it at once returns upon itself, producing thus the richer notion of multiplicity in unity.

This method Hegel uses throughout the entire range of knowledge. By this he accounts for the whole process of Becoming, the whole development of the Universe. He ranges the broad fields of Nature, History, Art, Religion, finding everywhere the same determining process of Thought. All this illusive world of "things" has thus sprung into being within Consciousness. Thought is the only Reality: and this is the *process* of Thought. This is the *method* of Evolution. It would be a fearful misuse of language to call this simple. Every student of Hegel revolts against the unutterable abstractness and complexity of his philosophy. And yet in a real sense it *is* simple, too simple. Everything is determined beforehand, in the whole realm of Existence, by certain fixed principles of procedure, discovered by intuition. If Hegel is right, then the problem of the method of Evolution is settled, irrevocably and certainly, by a philosopher who perceived the essential process and antinomy (i.e. self-contradiction) of Thought.

But, quite apart from the fact that Humanity is by nature a race not of Pure Idealists but of utterly incorrigible Realists, and that nothing is more calculated to create Realists than modern scientific investigation, Hegel is so demonstrably wrong that we need not hesitate to reject his explanation of evolutionary movement and method. He asks us at the very beginning of his philosophy to accept his proposition that "Thought is the only Reality,"

and everything else is Illusion." Of this startling proposition he offers no proof. Just as the ancient Idealists "assumed to themselves, with the Gods and a very small portion of mankind, the exclusive possession of the faculty of direct and immediate insight into Being in Itself" (Mahan's "Critical History of Philosophy," Vol. II, p. 156), so Hegel seems to depend upon an insight into the truth of his fundamental proposition, which is denied to the vast majority of mankind. The vast majority of mankind would at once and even fiercely deny Hegel's proposition. It contradicts universal consciousness. Only those would dream of accepting it who have spent much time in very abstract thought and thus removed themselves far from the immediate affirmations of consciousness. Put Hegel's first principle into another form, viz. "Thought is identical with its object"—and at once the universal consciousness of the race would assert that this is not only not true but that it is the exact opposite of the truth. We all know that our own thought, say of the Sun, and the Sun itself are not identical; and the affirmation that they are would arouse not conviction but derision. Universal consciousness would affirm the axiom of Euclid, "Things which are equal to the same thing are equal to one another," but would just as emphatically deny the axiom of Hegel, "Thought and its object are Identical."

Moreover, the Hegelian principle lands us in endless self-contradiction. Thought is the only Reality. But Reality and Unreality exist equally in Thought: and therefore Unreality must be as Real as Reality. Similar contradictions confront

us everywhere—and are in harmony with the essential antinomy of Thought as Hegel propounds it, viz. that everything is contradictory in itself, and its identity consists in the unity of two opposites. But if Unreality is just as real as Reality: or, if, to quote Hegel, "Being considered absolutely—considered as the Unconditioned—that is to say, Being in the abstract, apart from any individual thing, is the same as Nothing": if these things and a hundred like them be the facts of Life, then Thought is the wild Devil's dance of a nightmare, and we may as well cease to think at all. The words of G. H. Lewes are not too strong, "Of the three forms of Idealism this is surely the most preposterous: and that any sane man—not to speak of a man so eminent as Hegel—should for an instant believe in the correctness of the Logic which brought him to this pass—that he should not at once reject the premises from which such conclusions followed—must ever remain a striking illustration of the unbounded confidence in bad logic which distinguishes metaphysicians as truly a race mad with logic and feeding on chimeras."

We may unhesitatingly reject Hegelian Evolution. True, it revives a conception first broached by Heraclitus. True, also, that as we move through the realms of Nature, History, Art, Religion, we can see the vague forthshadowing of the Hegelian Thought Process. But the Hegelian principle in these realms only appears for a moment and vanishes away, like shadowy forms which for a moment the mist seems to take to the straining eyes of the wanderer among the mountains. Mankind seeks something more tangible, definite, certain: and the

long search for the definite and tangible largely account for the enthusiasm with which thinkers welcomed the methods so definitely and alluringly proposed by Darwinian Evolution. Darwin for the most part devoted himself to the problem of laying bare the method by which the higher organic forms are evolved out of the lower. His first great volume in its title and sub-title are strikingly explanatory : "The Origin of Species by Means of Natural Selection or the Preservation of Favoured Races in the Struggle of Life." His conception of the method of Evolution is "strictly mechanical," and "he has done much to eliminate the teleological method from biology," Prof. Sully declared in the "Encyclopædia Britannica." Yet Darwin left much room for teleological conceptions. He thought that a few original forms of life must be presupposed, and did not pretend to explain Variation.¹ He found

¹ By "Variation" is meant such facts as the following : Suppose we have before us a number, say, of men, or of fowls, pigeons, etc. We examine them and note a great number of differences between the individuals of the various groups. Some are due to age, or sex, or chance deformity—and may be disregarded. But others have been acquired during life, owing to food or habits or surroundings : e.g. some men are dark-bronzed by sunshine, others pale through indoor life. These differences are "acquired variations," often and better called "modifications." But there are other differences which we can only account for by supposing that the individuals somehow or other were born with them : e.g. a special marking may appear in the feathering of some of the fowls. These also are "Variations"—"germinal variations," i.e. inborn, and arising in some way quite unknown from the "germ-plasm" itself.

that Variations occur in great profusion. As to their causes, he mentions conditions of life, and specially excess of food, as a possible cause. "The conditions of life appear to act in two ways—directly on the whole organization or on certain parts alone ; and indirectly by affecting the reproductive system." ("Origin," p. 8.) There are "endless slight peculiarities which distinguish individuals of the same species, and which cannot be accounted for by inheritance from either parent or from some more remote ancestor." (p. 9.) The variations are generally very slight, but "at long intervals of time, out of millions of individuals reared in the same country and fed on nearly the same food, deviations of structure so largely pronounced as to deserve to be called monstrosities arise ; but monstrosities cannot be separated by any distinct line from slighter variations." (p. 9.) Darwin proceeds to refer to the effects of habit, and the use or misuse of parts as sources of Variation—in most of these points following Lamarck, for, as he himself says in his Historical Sketch ("Origin," p. xix.) : "With respect to the means of modification, he (Lamarck) attributed something to the direct action of the physical conditions of life : something to the crossing of already existing forms : and much to use and disuse, i.e. to the effects of habit." But after all his efforts to trace the reasons for Variations Darwin admits our ignorance. "*Summary.* Our ignorance of the laws of Variation is profound. Not in one case out of a hundred can we pretend to assign any reason why this or that part has varied. But whenever we have the means of instituting a comparison, the same laws

appear to have acted in producing the lesser differences between variations of the same species and the greater differences between species of the same genus." (pp. 203 and 204.)

But Variations occur in great profusion, and some of these Variations help their lucky possessors in the struggle for existence. Hence these lucky individuals survive when others go under: and thus, of the innumerable Variations which occur, we know not why, some are made permanent in the life of the species because they help in the struggle. Thus, Darwin speaks of the fortunate possessors of these useful Variations as being Naturally Selected for survival. What Man does in his horticultural and farming operations is only to intensify the process which Nature is always carrying on. For instance, in Virginia Darwin found the pigs eating Paint-Root (*Lachnanthes*), which caused their hoofs to drop off. But the *black* pigs could eat Paint-Root without dropping their hoofs, and therefore, as a Virginia farmer said, "We select the black members of a litter for raising, as they alone have a good chance of living." Such Selection, carried on more slowly, is, on the Darwinian Theory, Nature's Universal Method.

It is clear that this theory depends on the heritable quality of these, chiefly minute, Variations. "Any Variation which is not inherited is unimportant for us," says Darwin. "But the number and diversity of inheritable deviations of structure, both those of slight and those of considerable physiological importance, are endless." (p. 14.) Darwin gave due weight to the work of his predecessors, and thus gathered around himself the supporters of the great

men who had preceded him. He gave due place to the organism as a source of Variation, as had been done by Treviranus and Goethe : he recognized the part played by function, as Lamarck did, use and disuse having their inheritable consequences : he was wide awake to the influence of Environment, e.g. climate and food supplies, upon which Buffon laid much stress : and then he added to all that had preceded the new and alluring vision of Nature's *method* of change by the selection of the most fit. As millenniums and ages pass away these helpful Variations accumulate, and thus by the piling up of minute Variations one Species is transformed into another.

Thus Darwin propounded as the method of Evolution the following scheme of change :—

- i. That in all plants and animals Variations continually occur, many of them being acquired in the course of life, the important ones being "extremely slight" ;
- ii. That many of these Variations are inherited by offspring ;
- iii. That everywhere a great struggle for Life is proceeding ;
- iv. That some Variations help their lucky possessors in that struggle. Thus those possessing these Variations survive and leave offspring inheriting these Variations ; whilst the others die, leaving few offspring or none.
- v. That thus helpful Variations become permanent ; and, as ages pass on, by accumulation of these helpful Variations, new Species continually arise.

This is the method which Darwin christened "Natural Selection." It formed his great contribution to evolutionary thinking. It is the *second* definite and widely-accepted proposition respecting method, without which Evolution is only a fascinating but vague and uncertain dream. Such is the poverty of evolutionary thinking that only two methods have been propounded—one, the nightmare metaphysics of Hegel: the other, Natural Selection. This theory, advocated in simple language with a splendid profusion of illustration, gathered by a keenly observant mind, swept like a breath of fresh invigorating air over the world of evolutionary thought. The limitation of his observations to the evolution of the higher organic forms from the lower gave a fullness and definiteness to his contentions which was of immense advantage to evolutionary theory. Almost it might be said that in this case the part is greater than the whole. The support given to the theory of the gradation of existence both in the inorganic and the organic realms was greater from Darwin's limited field than from the whole of the rest of the realm of human thinking. It was soon widely asserted that Evolution was no longer a theory but a proven fact. Spencer's brilliant powers of generalization had produced the classic statement of Evolution, the intellectual brilliance of which could not blind us to the fact that its extreme abstractness was due to the vague and mainly speculative character of evolutionary thought. He declared Evolution to be "The integration of matter and concomitant dissipation of motion, accompanied by a continuous change, from an indefinite incoherent

homogeneity to a definite coherent heterogeneity, with structure and function, during which the retained motion undergoes a parallel transformation." The human mind, wearied with such abstractions, turned with a great sigh of relief from this style of thought and speech to Darwin's Origin of Species by means of Natural Selection, or the Preservation of Favoured Races in the Struggle of Life. But having read Darwin the human mind turned back again to Spencer and his fellows, with their vast conception of universal evolution, and concluded that the scientists had proved the philosophers right. Thus Darwin appeared to be victoriously carrying on his shoulders the evolutionary thinkers of two full millenniums.

CHAPTER V

DARWINISM AS A PHILOSOPHY ; AND ITS RELIGIOUS, PHILOSOPHICAL AND ETHICAL OUTCOME

BEFORE showing how scientific thought has revolted from Darwinism, it is desirable to consider the character of Darwinism as a philosophy, and its influence in the realms of religious, philosophical and ethical thought. The work of Darwin has beyond question exercised a vast influence upon these realms, and it is important to realize the directions into which he has turned the currents of human thinking.

Darwin was right when he said that his theory had wrapped up in itself "a whole of metaphysics"; and ultimately Metaphysics dominates thinking. Hence Darwin's influence upon Religion and Ethics, as well as upon Philosophy, can hardly be overestimated. Evolution is indeed itself a Philosophy rather than a Science—a very ancient speculation which hardly anyone even attempted to verify until Darwin conceived himself able to illustrate it from the realms of Nature.

Against Evolution as a Philosophy two serious charges lie. The first concerns her relation to the facts of Science. The relation between Science and Philosophy should be this: that Science *discovers*

and systematizes Facts, and Philosophy *explains* them. The explanation commonly involves a metaphysic, an ethic, and a creed : and hence the explanation belongs to Philosophy. It is often difficult to draw the strict lines of demarcation between the two, because what is called Science is continually passing over the boundary which divides facts from their explanation. Some, indeed, speak of the Science of Theories as distinct from the Science of Facts. But the Science of Theories closely approaches and is hardly distinguishable from Philosophy. Strictly, the position is just this: that, while the whole realm of Fact belongs to both alike, it is the function of Science to discover facts and of Philosophy thereafter to explain them. But in this evolutionary realm the singular and amazing position is, as will be more fully shown later in this volume, that Science has not provided any facts displaying the transmutation of Species, and evolutionary philosophers have elaborated theories based on nothing that can be called ascertained Fact, but floating in the air of ceaseless speculation.

Frank Evolutionists admit this. For example, Prof. Kellogg in his volume "Darwinism To-day," shows himself to be a very determined Evolutionist, leaning toward a Lamarckian position within the evolutionary camp ; but he admits (p. 381) :—

"The great strength of the Natural Selection explanation of species change and adaptation lies precisely in the logical nature of its premises and conclusions rather than on scientific observation and experiment" ;

and he proceeds in a Note to quote Loeb to the same effect :—

" It is remarkable that none of the Darwinian authors seem to consider it necessary that the transformation of species should be the object of direct observation. It is generally understood in the natural sciences either that direct observation should form the foundation of our conclusions, or mathematical laws which are derived from direct observation. This rule was evidently considered superfluous by those writing upon the hypothesis of Evolution."

Or, to call one more witness, that really eminent authority on Evolution, Prof. Bateson, in his Presidential Address to the British Association, 1914, declares that we have no facts, that we have no right even to form a theory, that we are too ignorant to speculate, and that our present speculations have about the same value as the speculations of the Alchemists about the Elements.¹ This, then,

¹ The Zoologist, Prof. F. von Wagner, a Darwinian Evolutionist, writing in 1900 " Regarding the Present Status of Darwinism " admitted that at that time, forty years after the publication of " The Origin, " it was almost impossible to trace with any certainty the action of Natural Selection in the process which results in the production of a new species. " At the outset it was reasonable to hope, that with the progress of science this difficulty would be solved or at least lessened, but this expectation has not been realized." And again, " when men of science take occasion to repudiate Darwinism, *because of our inability to explain satisfactorily any particular case by means of the theory of selection*, this inability arises not from the theory of Darwin but from the *inadequacy of our experience*. For as yet the *empiric prerequisites* for an objective judgment regarding the validity or futility of the theory of selection *are entirely lacking*." (The italics are mine.) In other words, the Darwinian theory, after forty years of ardent research, had no confirmation in experience. (Quoted in Dennert's little book, " At the Deathbed of Darwinism, " Chap. VI.)

is the first objection which lies against Evolution as a Philosophy, i.e. as an explanation of the facts which Science has collected and presented for explanation : that Science has *not* collected any facts and that the evolutionary philosopher has not yet any basis for his Philosophy ; that is, he has not as yet anything to explain.

The second charge which lies against Evolution as a Philosophy is a corollary of the first : viz. that Evolutionists have never sufficiently distinguished between, on the one hand, those movements of the mind by which one type of being can, in thought, be logically transformed by continuous changes into another type of being—and, on the other hand, the actual movements in the external world of Nature, which latter still remain almost entirely unknown. Speaking of the ancestry of the human race Darwin says, for example, that we might “*imagine* three lines of descent proceeding from a common stock” : that it is “*quite conceivable* that two of them might after the lapse of ages be so slightly changed as still to remain as species of the same genus.” Or, again, in the “*Origin*,” “Under Nature the slightest differences of structure or constitution *may well turn* the nicely balanced scale.” Evolutionists have confused what can be “*imagined*,” what is “*quite conceivable*,” what “*may well turn* the nicely balanced scale” (“*Descent of Man*,” pp. 235 and 236 ; “*Origin*,” p. 102), with what actually is ; and have rested content with the imaginable, the conceivable, and what may well be. Or take, as further instances, from a vast selection the following quotations :—

" It has been asserted that of the best short-beaked tumbler pigeons a greater number perish in the egg than are able to get out of it ; so that fanciers assist in the act of hatching. Now *if Nature had to make* the beak of a full-grown pigeon very short for the bird's own advantage, the process of modification *would be* very slow, and there *would be* simultaneously the most rigorous selection of all the young birds within the egg which had the most powerful and hardest beaks, for all with weak bodies *would* inevitably perish : or more delicate and easily broken shells *might* be selected, the thickness of the shell being known to vary like every other structure " ("Origin," p. 106).

" Let us take the case of a wolf, which preys on various animals, securing some by craft, some by strength, and some by fleetness ; and *let us suppose* that the fleetest prey, a deer for instance, had from any change in the country increased in numbers, or that other prey had decreased in numbers, during that season of the year when the wolf is hardest pressed for food. Under such circumstances the swiftest and slimmest wolves *would have* the best chance of surviving and so be preserved and selected " ("Origin," pp. 110 and 111).

" The tubes of the corolla of the common red and incarnate clovers do not, on a hasty glance, appear to differ in length : yet the hive bee can easily suck the nectar out of the incarnate clover but not out of the common red clover. . . . Thus in a country where this kind of clover abounded it *might be* a great advantage to the hive bee to have a slightly longer or differently constructed proboscis " ("Origin," p. 117).

The italics are mine : and serve to call attention to the fact that Darwin's illustrations from Nature are not illustrations from Nature at all, but are from his own mind. He saw how, in thought, logically, changes " *might* " take place : what the changes " *would be* " " *if* " Nature acted in the way in which his own mind was acting, and if the

external world actually is what we "may suppose" it to be in our thought. The theory was formed first; then Nature was conceived of as being the external replica of the thoughts and processes of our minds. So also Bateson remarks, in his essay in "Darwin and Modern Science" (p. 90): "To him (i.e. Darwin) the one paramount purpose was to show that somehow an Evolution by means of Variation and Heredity *might have brought about* the facts observed." The italics are mine. It is not what Variation and Heredity *did* bring about but what it *might have* brought about. So, again, it is quite in keeping with all this to find Profs. Geddes and Thomson (cf. "Evolution," p. 195) dwelling on what "may" happen, what "may be conceived," and what there is nothing to "preclude." Darwin did not gain his theory from impartially observed facts of Nature. He formed a logical theory within his mind, and then tried to exemplify it from what would be, and might be, and is quite conceivable, in the external world. The thing required is Evidence, we need Facts—not assertions of what is conceivable and logically possible. But Evidence is not offered, and Facts cannot be supplied.

The Evolutionist has been almost as independent of external observation as if he were a Pure Idealist; and, indeed, the Pure Idealist is evidently the thinker who in this respect is best fitted to propound the evolutionary philosophy. For he bases everything upon his axiom that Thought is the only Reality: and if he can show how in the necessary movement of Thought there is a continual flux of things (which etymologically are "thinks"), and a

continual transformation of one form into another, he stands evolutionally in a very favoured position.

None the less it cannot be doubted that Evolution, as Darwin propounded it, makes a fatal demand upon the Idealist. For with immense emphasis it declares that the internal is not alone sufficient ; that the external has a great part to play. The struggle for existence involved the conclusion that only such internal things are able to survive as have power to battle against the external conditions of life. To recognize this aggressive distinction between the internal and the external is itself fatal to a system which bases itself upon the axiom that the internal, *viz.* Thought, is the only reality. Hence, Evolution has to choose between two alternatives : it may frankly say with the Pure Idealist, that the rational is the real, and that the internal movements of Thought are the realities upon which it rests: or it may admit that the logical processes of the mind must be paralleled in external observation if they are to have any value. Either alternative is fatal to the Evolutionary Theory or Philosophy : for Evolution destroys the pure Idealism which it seeks to base itself upon, in the first alternative : and in the second alternative, it is forced to admit that external observation has not yet yielded any parallel to those logical processes of the mind by which, in theory, one type of being can be gradually transmuted into another type.

But however faulty as a philosophy, its influence upon philosophic, religious and ethical thought has been immense—and not any the less because in general indirect and only half realized. It has in

all directions immensely aided that movement which is usually called "Sceptical."

Let us take first its influence upon religion, by which we mean Theism, and in particular the Christian Faith. The Darwinian Theory was jubilantly welcomed from the first because it struck hard at the whole Christian and teleological view of the World. Indeed, all down its long history the main line of Evolutionary thinkers have been eager to dispense with the supernatural and to display the needlessness of God. One need only mention such names as Empedocles, Epicurus, and Lucretius in the ancient Evolutionary period; and, in the modern period, Spencer, Tyndall, Huxley, Romanes in his earlier years, and the main line of the modern advocates of Evolutionary ideas. The reason is not far to seek: for Evolution maintains that the mighty changes in the organic and inorganic realms have been, and are being, wrought by *resident* forces, and no supernatural interventions are required. Thus Prof. H. F. Osborn, of the New York Natural History Museum, who is one of the foremost advocates of Evolution, says in his book "The Origin and Evolution of Life" (p. x. of Preface):—

"In truth from the period of the earliest stages of Greek thought, Man has been eager to discover some natural cause of Evolution and to abandon the idea of supernatural intervention in the order of Nature."

He himself holds to a kind of spontaneous generation of life and believes that in the Evolution of life no *Creation* is involved. He thinks it is Law, not Chance, which orders Life: but by Law he only

means some principle contained in organisms, and says "we may first exclude the possibility that it acts either through supernatural or teleological interposition through an externally creative power" (*ibid.*, pp. 1-10).

But Theism, and in particular the Christian Faith, is altogether based on the supernatural: and the Scriptures of the Old and New Testaments give no countenance to the Evolutionary Theory—a theory which must have been well known to such a writer as St. Paul. The creation of the plants and animals, "after their kind": the creation of Man in the image of God: the Fall of Man: the Bible conception of Sin, Atonement, Regeneration: the Bible picture (and Hope or Fear) of the future of the Race—all these, fundamental things of the Bible revelation, are inconsistent with Evolutionary conceptions. Hence the acceptance of the latter necessitates new views concerning the Bible: and that rationalistic movement generally called "The Higher Criticism" has for one of its main supports to-day the Theory of Evolution. These are matters of vast importance to the Christian Faith.

It is not accidental that the Evolution Theory has such effect upon the Doctrine of Scripture and upon the Christian Faith, and that it is in general hostile to supernaturalism; and this is shown by the very similar influence it has upon the theory of knowledge. Epistemology, as it is commonly called, i.e. the science of true Knowing—the settlement of the question, Can we trust the Mind to give us true knowledge of the external Universe?—is deeply

influenced by evolutionary theory. The *forms of thought* must, upon Darwin's assumption, survive and exist to-day because they are such forms as have given to their possessors some advantage in the life struggle. They are not necessarily the only forms, the best forms, or even the true forms : they are advantageous forms, which humanity has found, in pragmatic language, "to work." It is quite possible that under other life conditions very different forms of thought would have developed and survived to-day : and then our "knowledge" would have been a very different thing. It is quite possible that the future may develop very different forms, and our "knowledge" change accordingly. All that Evolution permits us to believe is that these forms survive and mould our knowledge to-day because of some advantage bestowed in the changing conditions of life now past. Kant assumed that the dark and unknowable world of existence, outside ourselves but constantly impinging, through the senses mainly, upon our human intelligence—that world of existence which he called "the thing in itself"—was in mysterious accord with the categories of the human mind. We cannot be certain : but we need not doubt that all those impressions which the "thing in itself" ever will convey to us will align themselves along the common highways of our thinking. But Darwin negatives any such metaphysic. Certainty is gone. The sceptic position is vastly reinforced. It is possible and even probable that the real world outside the mind is utterly different from what we conceive it to be. Our categories of thought—space, time, substance, num-

ber or quantity, relation whether of simultaneity, sequence, cause or what not—these have been useful, and therefore have survived. But they may not be essential, or unchangeable and dependable, or even real in the sense that they actually correspond with the realities of the external Universe.

This is the epistemology of Pragmatism, which is too manifestly Darwinian in its cast of thought to admit of any great doubt as to its affiliation. Pragmatism denies the existence of any such thing as a truth which consists in the correspondence between an idea in our mind and an external reality. So far as we can judge, the human mind has within it no knowledge such as we may suppose to be possessed by a transcendent mind, not limited like our own. According to Pragmatism, for example, it would be foolish to ask, *Is this theory true?* if we mean thereby, *Does it correspond with the actual objective facts with which it is supposed to be concerned?* About those objective facts we know nothing, and we know nothing either of the absolute truth of theories. Theories are not answers to enigmas, solutions of difficult problems. Theories are simply instruments with which we work, the Pragmatist declares. If they work well, they are what we call "*true*." The truth of an idea is not "*a stagnant quality inherent in it*." Truth, says William James, *happens* to an idea. Quite possibly the theory or the idea is not true to-day, but *will become true* to-morrow. Events happen, circumstances change, and the idea becomes true—i.e. it works, it proves its advantage to us. That is the only test we have to determine what we call the

“ truth ” of any idea or theory. A theory’s validity, says James, is simply the process of its validation. It is verified by working advantageously. That advantageous working is actually its verification, its being made true. If an idea or theory enables us to handle things, whether things intellectual or things practical, better than we could do without it, then that idea or theory is what we call “ true.” It is true for us, it is true for the present, but we know nothing about its “ truth in itself.”

The jaunty sceptic note of this is essentially evolutionary. Truth itself is being evolved. So far as we can know it, it has none of the majesty of the Everlasting Hills: that for Pragmatism would be a “ stagnant quality.” Truth is just a changing part of this changing world. What helps me in the struggle for existence is what I call “ truth ”: and Pragmatism is unquestionably a part of that “ whole of Metaphysics ” which Darwin saw wrapped up in his evolutionary theory.

These are not small results either in the Religious or in the metaphysical sphere: and the seriousness of the influence of the Darwinian theory is even further emphasized when we pass into the ethical realm. To Spencer engaged in his great System of Philosophy and eager to maintain a Utilitarian theory of Morals, Darwinism came as an immense reinforcement. It solved many problems which seemed insoluble until the life of the Race supplanted the life of the individual. It is only the Evolution hypothesis which makes Utilitarianism a possible theory of Ethics: and, indeed, if Evolution is true Utilitarianism is not only possible but probable and

perhaps even certain. Evolution solves the problems of the Utilitarian theory of Ethics to its advocates' satisfaction ; and on the Pragmatic basis Evolution must therefore be considered a " true " theory, because it enables us to handle the problems of Utilitarian philosophy better than would be at all possible without it. It is interesting to note in passing that the pragmatic argument is the very argument which Sir Arthur Keith advances in the " Nineteenth Century " for August 19, 1922, in his attempt to validate the Evolutionary Theory. But quite apart from the fact that the Evolution Theory and the Theory of Utilitarian Ethics are in this conjunction made mutually dependent each upon the other—like two disabled men supporting one another home—it would be a bad thing for Ethics and a disaster for the human race if the Moral Imperative, the " Ought " which gives to life its meaning and dignity, were submerged and lost in mere ancestral considerations of gain and pleasure, of loss and pain.

But Evolution has had other and vastly more dire outcome in the Ethical realm. Nietzsche was essentially a Darwinian, and it makes no manner of difference that Darwin did not desire that his theory should result in the relentless ethic of the struggle for existence, and himself argued in a very different strain. There is a logic of the human mind which no adverse desires or efforts can affect. Nietzsche took the Darwinian view that humanity, as it is, is the resultant of the relentless struggle ; but to Nietzsche the struggle was hindered by a folly which is called " morality," and particularly the morality

of the Christian Faith. He deliberately aimed at the removal of this hindrance, and at the development of that "higher type" of humanity which the struggle for life, unrestrained by any morality, would, he believed, produce.¹ The scorn with which he dismisses the "slave morality" of Christianity: the shamelessness with which he avows that the "higher type" of humanity will indulge itself in intoxication, sexuality, cruelty, crime not to be repented of: the unblushing proclamation of Power as the aim of the "higher" type, and of the Will to Power as the highest characteristic, and likewise of the necessity that the powerful should enslave the weak to do them service: all this constitutes a foul immorality directly traceable to the Darwinian Theory and incredible apart from such

¹ "It is so arranged," said Nietzsche, "that culture in its triumphal march benefits only a trivial minority of privileged mortals, and it is necessary that the slave service of the great masses be maintained if one wish a full joy in becoming. So let us avow this cruel-sounding truth: slavery is necessary to Culture."

Again: "He who preaches morality to us debases himself in our eyes and becomes almost comical" ("The Will to Power," p. 202).

Again: Our religion, morality and philosophy are "decadent human institutions," "The Counter-agent is Art" (*ibid.*, p. 238).

Again: in the Artist "Three elements above all are active: sexuality, intoxication, cruelty" (*ibid.*, p. 243).

Again: "The strongest test of character is to resist being ruined by the seductiveness of goodness. Goodness must be regarded as a luxury, a refinement, a vice" (*ibid.*, p. 350), and so on and on *ad nauseum*. Nietzsche like Milton's Devil said deliberately—in effect—"Evil, be thou my good."

theory. For years it had its outcome in the increasing debasement of German life, where Nietzsche was the almost universal subject of the Universities' philosophical curricula ; and also in the formation of a national " Will to Power " as the national world policy, which in 1914, after long and careful planning, drenched the world in blood and tears.

Such are some of the philosophic, religious and ethical results of the Theory of Evolution, rendered fascinatingly clear and plausible in its Darwinian form—such results as justify us in saying that in this theory

Divine Philosophy
Has pushed beyond her mark, to be
Procureess to the Lords of Hell.

It is always wise and useful to know where we are going.

CHAPTER VI

THE REVOLT FROM DARWINISM

YEET to-day Darwin's theory is denied at almost every point: and the real leaders of scientific and philosophic thought form a very different estimate of his position and value from that formed in the seventies and eighties of the nineteenth century.

i. The first point of departure from Darwin's positions concerns the heritability of acquired modifications—a point of whose vital importance the shifts to which Darwinian advocates are put speak very eloquently. The minute Variations upon whose heritable quality Darwin's thought depends, are now commonly regarded as not being heritable. Of the three sources of Variation—environment, function, and the organism itself—the heritable quality of the two first is generally questioned to-day. To maintain something which approaches the heritable quality Professors Geddes and Thomson call upon us to be more "subtle" in our thinking ("Evolution," p. 192). Semon's theory of the "engrams" and the "Mneme" is invoked. "Even a bar of iron is not quite the same after it has been once struck: how much more a living creature which is specialized towards

gaining and garnering experience. There is always a residual effect: this Semon calls an 'engram,' and the sum of the engrams of a living creature is its 'mneme'—its organic lore, its bodily and subconscious memory" (p. 195). So that if "the result of this experience may be conceived as accumulating from generation to generation, even though, as Weismann maintains, individually acquired modifications may not be entailed as such," yet we *may conceive* "the effects of an oft-repeated stimulus" as "saturating through the organism by nerve paths and protoplasmic bridges and the fluent blood": and "what then precludes them, in some cases at least, from reaching even the germ-cells in their recesses?" ("Evolution," pp. 195 and 196). This, surely, is a return to the ancient Greek philosophic manner in place of the modern scientific mode. These are mere vague suggestions as to what *may be* instead of definite statements as to things as they *are*. Such a string of "if's" and "may's" really only emphasizes the fact that the heritability of functional and environmental Variations is really abandoned.

Or again, something very much less than heritability, and something which gravely lengthens the already vast periods postulated by Darwin for the evolution of Species, is advanced by Lloyd Morgan, as quoted by Geddes and Thomson with approbation on pages 199 and 200. "Suppose that a group of plastic organisms is placed under new conditions. Those whose innate plasticity is equal to the occasion are modified and survive. Those whose plasticity is not equal to the occasion are eliminated. . . .

Such modification takes place generation after generation, but, as such, is not inherited. . . . But any congenital variations similar in direction to these modifications will tend to support them and to favour the organism in which they occur. Thus will arise a congenital predisposition to the modification in question. The plasticity still continuing, the modifications become yet further adaptive. Thus plastic modification leads and germinal modification follows: the one paves the way for the other. The modification, as such, is not inherited, but is the condition under which congenital variations are favoured and given time to get a hold on the organism, and are thus enabled by degrees to reach the fully adaptive level." Such a theory can only be regarded as a brilliant forlorn hope. It means that the heritability of acquired characteristics is of necessity jettisoned, and that all that can be claimed is that the environment of an organism may so modify that particular organism as to favour certain further modifications *if those modifications arise from the germ-plasm of that organism itself.* Yet even this is far more than can be claimed: for all this is *sheer speculation*, quite rightly called subtle because it is the elaboration of *mere intellectual possibilities*, and is not founded upon ascertained fact. Moreover, it makes impossible time demands. No one can really pretend that the Variations which have occurred and been established have actually taken the vast period to come into existence which the part Prof. Lloyd Morgan assigns to environmental and functional modification demands. Those who are termed "Neo-Darwinians" to-day generally

believe that at given moments, after periods of quiescence, there occurs a general tendency to change. The fact is that there is a general agreement that the heritability of acquired characteristics has to be entirely laid aside; and these subtle theories only emphasize the consciousness that there is a fatal flaw in the Darwinian evolutionary method.

Those variations which are heritable are such as spring from the organism itself. They are due to some innate variability of the germ-plasm. But see what this involves. Forty years ago it was confidently claimed by Darwinians (though not by Darwin) that Darwin had established a purely mechanical explanation of the method of Evolution, and that he had dealt a hard and probably fatal blow at the whole teleological conception of the world. A planned consummation, toward which a great Intelligence is ever working, appeared needless, and therefore impossible of acceptance, since the coming into existence of the Species of living things is accounted for by the Natural Selection of certain Variations out of the almost infinite fortuitous number which continually arise from all manner of known and unknown causes. That was forty years ago more or less: but long consideration and research have banished from the story all Variations except such as proceed from the germ-plasm itself. These Variations are not to be regarded as casual, but as causal: and the cause is back of everything. That is to say, we have to go back and back, till we reach the beginning, to account for them. The only possibilities of

development are those which are latent in the germ-plasm itself. This at once switches us back on to teleological (i.e. purposive or Theistic) lines. There is no escape from the conclusion that the lines of evolution are predetermined within the organism itself. There may be several possible lines of evolution, but in any case they are all limited to the potentialities of the original organism. Thus, Prof. Bateson says: "On the other hand, with the experimental proof that Variation consists largely in the unpacking and repacking of an original complexity (i.e. in the germ-plasm) it is not so certain as we might like to think that the order of these events is not predetermined" ("Darwin and After Darwin," p. 101). Or again, Profs. Geddes and Thomson admit "Natural Selection remains still a *vera causa* in the origin of species; but the function ascribed to it is practically reversed. It exchanges its former supremacy as the supposed sole determinant among practically indefinite possibilities of structure and function, for the more modest position of simply accelerating, retarding or terminating the process of otherwise determined change" ("Evolution," pp. 247 and 248). So also again Dr. Alfred Russel Wallace in an address at the Darwin Anniversary at the Royal Institution, London, said, referring to Haeckel: "These unavailing efforts seem to lead us to the irresistible conclusion that beyond and above all terrestrial agencies there is some great source of energy and guidance, which in unknown ways pervades every form of organized life, and of which we ourselves are the ultimate and fore-ordained outcome"

(quoted in "The Fundamentals," Vol. VIII, p. 45). Even Darwin himself contemplated the possibility that we may have to postulate a few original forms of life from which the process of Evolution makes a beginning. That suggestion of Darwin himself turns our eyes away from the mechanical and toward the teleological and creational outlook. If the only heritable Variations are those which arise from the germ-plasm itself, then the explanation which best fits the facts is the explanation Religion advances, viz. a Great Intelligence superintending the execution of a wondrous plan. This is a serious retreat for the typical evolutionist: but it is only one of many forced retirements.

ii. But yet further, the departure from Darwinism is very marked in the estimate of the value of the two degrees of heritable Variation. The great multitude of Variations are minute in character, and only a few by comparison are of considerable dimensions. Those Variations which arise from function and environment are to-day generally known under the name "modifications" and are dealt with above as being not inheritable. Possibly they have an indirect influence, but as being non-inheritable they are of slight and dubious importance. But of those Variations, still called by the name, which arise from the organism itself, there are two classes. The one class are "extremely slight," as Darwin phrased it, in their dimensions. These are called "fluctuations," "individual variations," "continuous variations," "ordinary variations," "gradual variations"—and are, in very large measure at least, inheritable. The second class

consists of Variations which are large and marked in character; and these are called "sports," "single variations," "discontinuous variations," "saltatory variations," "mutations." All Darwin's emphasis was laid upon the "extremely slight" Variations. "The more I work the more I feel convinced it is by the accumulation of such extremely slight variations that new species arise." From the big Variations, the Mutations, Darwin turned almost entirely away (*vide* "Origin," p. 66, pp. 313-318, etc.).

From this position of Darwin's the scientific world has entirely revolted. The "Mutation Theory" of Prof. Hugo de Vries, professor of Botany in the University of Amsterdam, is now very widely accepted. De Vries concluded that the small or continuous Variations have nothing to do with the origin of Species. "This form of Variation," he said ("The Mutation Theory," Vol. I, p. 4), "cannot even by the most rigid and sustained selection lead to a genuine overstepping of the limits of the species, and still less to the origin of new and constant characters." He maintained that new species arise suddenly, without any known preparation, through Mutations, which are thoroughly heritable and breed true from the first. Species arise suddenly. They leap into being. De Vries (in his *Essay in "Darwin and After Darwin"*) argues that Natural Selection still has its part to play inasmuch as the beneficial Mutations are those which survive and propagate. "Natural Selection acts as a sieve; it does not single out the best variations, but it simply destroys the larger number of those which

are, from some cause or another, unfit for their present environment. In this way it keeps the strains up to the required standard, and, in special circumstances, may even improve them" (p. 70). But though Natural Selection be still allowed its function, it is impossible to question that the Mutation Theory is a very far cry from Darwinian Evolution. Thus Sir Oliver Lodge in his presidential address on "Continuity," when President of the British Association at Birmingham, 1913, said :—

"Biology may be said to be becoming atomic. It has long had natural units in the shape of cells and nuclei, and some discontinuity represented by body-boundaries and cell walls; but now in its laws of heredity, as studied by Mendel, number and discontinuity are strikingly apparent among the reproductive cells, and the varieties of offspring admit of numerical specification and prediction to a surprising extent: whilst modification by continuous variation, which seemed to be of the essence of Darwinism, gives place to, or at least is accompanied by, Mutation, with finite, and considerable, and in appearance discontinuous change. So far from Nature not making jumps it becomes doubtful if she does anything else. Her hitherto placid course, more closely examined, is beginning to look like a kind of steeplechase" (p. 29).

Anyone who consults the chapter headings in "The Origin of Species," Chapter VI, will find among the headings "Natura non facit saltum"; and if he reads the chapter he will find such words as these (p. 244): "Why, on the theory of Creation, should there be so much variety and so little real novelty? Why should all the parts and organs of many independent beings, each supposed

to have been separately created for its proper place in nature, be so commonly linked together by graduated steps? Why should not Nature take a sudden leap from structure to structure? On the theory of Natural Selection we can clearly understand why she should not; for Natural Selection acts only by taking advantage of slight successive variations; she can never take a great and sudden leap, but must advance by short and sure, though slow steps." Now de Vries entirely throws over Darwin's view of Variation: what Nature does, when she creates a new Variety, is just to take a leap, whilst Darwin's accumulation, through ages, of minute continuous Variations is utterly denied. It is doubtful if Nature does anything else but make jumps! Prof. Bateson, the great authority on Variation, goes even further. He thinks that all Variation, *except such as consists in the loss of a character either in whole or in part*, arises from Crossing. Moreover, he speaks of the problem of Variation as an "insistent oppression," and cannot admit the existence of any Variation which consists in the putting forth of a new character, unless it be by the before-mentioned Crossing. Can this reference to "an insistent oppression" mean that the Darwinian Theory has been exalted into so sacred a dogma that the candid seeker after Truth finds the necessity to part with Darwin a dire struggle and burden? At all events it is clear that Truth has necessitated the breach, and it is both interesting and provocative of much questioning to find that some who reject Darwin's fundamental contention of the inheritance of acquired

characteristics, and teach that the essential causes of variation are the differences inherent in the germ-plasm of the species and not the experiences or behaviour of the individual in the course of his career ; and who also are disposed to admit de Vries' contention that at a given moment, after a long period, the entire species is beset with a tendency to change—yet apparently wish to be called *Neo-Darwinians* ! Scientific Orthodoxy seems to have become in no small measure fixed and rigid—and yet with how little ground in reason. The Christian Faith has often been charged with its rigidity ; but the Christian Faith was ratified by the Resurrection, and that, and that alone, is the justification for its dogmatic certainty.

iii. But yet further, Darwin's theory was that certain Variations favoured the individual's chances of survival in the struggle for life, and thus because of their utility were perpetuated. Concerning this, as an adequate account of the perpetuation of Variations, doubts arise on all hands. Darwin's mechanical explanation, viz. that Nature blindly selects them because they are useful in the struggle, is seen not to explain many things in any measure at all. Dr. A. R. Wallace admitted this failure very plainly in an interview with Mr. H. Begbie near the end of his life, of which an account is given in a little booklet which Mr. Begbie published, entitled "New Thoughts on Evolution." On what ground of utility to its owner in the struggle for life, Dr. Wallace asked, can we explain the wonderful feathering on a butterfly's wing ? "The scales on the wing of a moth have no explanation in

Evolution. They belong to beauty, and beauty is a spiritual mystery." Moreover, "Some one has said that a single feather from a heron's wing is composed of over a million parts. The quill is socketed, held together by little contrivances of the nature of hooks and eyes. It is of a material so light that a finger can twist it out of shape, but if it gets pierced or separated by any slight blow it becomes quickly reunited and restored. . . . All the beauty is in the feathers. Strip a bird of its plumage and what was the perfectest thing becomes at once the most ugly and comical. . . . Such is the wonder of feathers. And how do they grow? Evolution can explain a great deal: but the origin of a feather and its growth, this is beyond our comprehension, certainly beyond the power of accident to achieve" (pp. 12 and 13). Dr. Wallace expressed his intense belief in an original Creation, and also in a later Creation of the soul of Man, viz. that when Man emerged from his (supposed) ape-like ancestry God created the soul. Thus the co-discoverer of Natural Selection did not think that Evolution was sufficient to explain the organic world without the foundation work and later intervention of Creational Power.

Or again, Sir Oliver Lodge, ranging more widely and questioning the mechanical explanation of beauty throughout the Universe, says:—

"When we examine each parti-coloured pennule in a peacock's tail, or hair in a zebra's hide, and realize that the various shades in each are so placed as to converge to a general design and pattern, it becomes exceedingly difficult to explain how this original co-operation of parts,

this harmonious disposition of pigment cells, has come about on merely mechanical principles. It would be as easy to explain the springing of the cantilevers of the Forth Bridge from its piers, or the flocking of the stones of the Nile Dam, by chemiotaxis. Flowers attract insects for fertilization : and fruit tempts birds to eat it in order to carry seeds. But these explanations cannot be final. We have still to explain the insects. So much beauty cannot be necessary merely to attract their attention. We have further to explain this competitive striving toward life. Why do things strive to exist ? Surely the effort must have some significance ? the device some aim ? We thus reach the problem of existence itself and the meaning of existence.

“ The mechanism whereby existence entrenches itself is manifest, or at least has been to a large extent discovered. Natural Selection is a *vera causa* so far as it goes : but if so much beauty is necessary for insects, what about the beauty of a landscape, or of clouds ? What utilitarian object does that subserve ? Beauty in general is not taken into account by science. Very well, that may be all right : but it exists nevertheless. It is not my function to discuss it. But it is my function to remind you and myself that our studies do not exhaust the Universe ; and that if we dogmatize in a negative direction, and say we can reduce everything to physics and chemistry, we gibbet ourselves as ludicrous narrow pedants and are falling far short of the riches and fullness of our human birthright ” (“Continuity,” pp. 81 and 82).

Thus the organic world—to say nothing of the inorganic—demands explanations which Evolution is admittedly unable to supply. Natural Selection cannot explain the wing of a heron, or the wing of a moth, or the bloom of a plum, or the beauty of a flower. So also the immense complexity of co-ordinated variations, such as those involved in the power of a cat to spring or of a bird to fly, entirely

baffles the efforts of the Darwinian even to suggest, and how much more to demonstrate, a reasonable explanation. Take for instance Spencer's famous illustration of the cat. Its power of leaping is of manifest advantage. Yet in order to leap and thus gain the advantage there must be simultaneous variation of very many of the bones, simultaneous variations of the muscles and tendons of the fore parts, and simultaneous variation of the muscles and tendons of the hinder parts. Changes of the nervous system must also be co-ordinated with one another and with the muscular movements which they are designed to control. Or take again the complexity of the co-ordinated Variations in the case of the Giant Stag of the Irish peat. Its enormous antlers demanded not only a stronger skull bone, but also stronger muscles, stronger sinews, and stronger bones in the whole framework of the body, as well presumably as corresponding changes in the whole network of the nervous system. As the antlers varied and size gradually increased, so must all these other changes have gradually taken place in unison. Yet it is inconceivable that so many processes of selection should have taken place simultaneously.

Or again, Prof. August Weismann ("Darwin and After Darwin," pp. 34 and 35) gives the case of the soldier ant, whose business it is, with his enormous jaws and teeth, to defend the colony. He "is hardly less heavily burdened than the Giant Stag with his antlers: and in the ant's case, too, a strengthening of the skeleton, of the muscles, of the nerves of the head, and of the muscles of the

legs, must have taken place parallel with the enlargement of the jaws. *Harmonious adaptation* (co-adaptation) has here been active in a high degree, and yet these soldiers are sterile! There thus remains nothing for it but to refer all their adaptations, positive and negative alike, to processes of selection which have taken place in the rudiments of the workers within the egg and sperm-cells of their parents." The simple Lamarckian explanation that use produces harmonious changes which are all inherited, the view which Darwin originally adopted, is impossible here not merely because acquired characteristics are not inherited but because these soldier ants are infertile. The harmonious changes have to be referred back to the parents, and Darwin advanced the theory, which Prof. Weismann accepts, that the colony which in some unknown way produces the soldier ant survived because the soldier ant gave it advantage in the struggle. But how did the parents come to produce "soldier" offspring in which all these complementary Variations from the usual ant type occurred together? The problem becomes immensely more complex and difficult. Prof. Weismann propounds a theory of "germinal selection," through varying nutritive flow to the various "ids" or granules of the germ-substance or germ-plasm. Something within the germ-plasm has to see to it that the right nutritive flow is allotted to each of the "ids," in order that they may develop within the germ-plasm in such an adaptive manner as to produce the harmonious variations in the soldier ant. The nutritive stream is made up of

"determinants," which are the primary constituents of the "id," thousands of them being required to make up a single "id"; and without the Infinite Divine Mind and power to control this "nutritive stream," it would be interesting were some mathematician to calculate for us the chances *against* the perfect co-ordination of the supply of "determinants" to each germ-granule or "id," so as to produce in the offspring the exact balance of muscle and nerve required in the complex organism of the soldier ant. The chances of this perfect co-ordination taking place within the germ-plasm are almost infinitely remote. Natural Selection surely never faced such an impossible complexity. The odds against the *ids* are far too great!

Perhaps it is worth while to point out that Prof. Weismann with this attempted explanation of simultaneous Variations again shows how Evolutionism to-day is wandering far away from the fields of ascertained fact and simply revelling in unproven and unprovable theory. For even if the "ids" are perceptible under the microscope and have an actual existence, the "determinants," "thousands of which must go to make up a single 'id,'" are "far below the limits of microscopic visibility," says Prof. Weismann, and thus although they "must go" to make up the "ids" they may not, for all that anybody knows, themselves have any existence at all! The truth is, of course, that Natural Selection is encountering insuperable obstacles. All these immensely complex co-ordinated Variations, occurring simultaneously, make it impossible reasonably to believe that they originated

fortuitously in the blind mechanism of nature.

Natural Selection will not explain the occurrence of features which are apparently needless in the struggle for life. For example, in a recent article in the "Daily Chronicle," Mr. Bassett Digby, F.R.G.S., calls attention to such a case. The female of the Vapourer Moth has only rudimentary wings, quite incapable of flight: and it is by an apparent very marvellous "wireless" that she is able to attract to herself the male and this even from a distance of two miles away. This might easily be explained theoretically by Natural Selection, i.e. the female cannot fly, and therefore only such Variations as possess this wonderful "wireless call" to the male can continue to exist. But how shall we explain the fact that the females of the Emperor Moth, the Fox Moth, and the Oak Eggar Moth, which have fine powers of flight and therefore no need of these "wireless" powers, yet possess these powers in even more striking form than the female of the Vapourer? Or again, there is a peculiar luminosity, radiating in the darkness from the nasturtium, the marigold, and the sunflower. It is a striking characteristic, and so far as is known is not of any value to the plants in the battle of life. Natural Selection is confronted by hosts of such problems, which it cannot solve. May I illustrate this by brief extracts from the Index of Prof. Kellogg's book "Darwinism To-day." Prof. Kellogg writes as a Darwinian, in sympathy at least, but as a seeker after Truth, who recognizes that we are in need of more and more study, collection of facts, and careful analytical thought: and

that it is impossible to maintain the Darwinian theory in any full sense to-day. Here are a few headings in his Index under the word "Selection":—

Selection ; artificial, natural selection resting too largely on analogy with ; cannot explain complete degeneration ; . . . difficulty of explaining complex relations among body-parts by ; difficulty of explaining interspecies sterility by ; difficulty of explaining repeated identical structures by ; . . . geologic time too short to give it opportunity to do its work ; hindering rather than promoting species change ; . . . may produce continuous change but not discontinuous series of species ; Korschinsky's radical position against ; Morgan's antagonism of species-forming by ; . . . not able to explain complex adaptation ; not able to explain degeneration ; not able to explain overspecialization ; not able to produce many-branched descent and discontinuity in series ; objection to, based on the linear and quantitative character of fluctuating variations ; objections to, based on overspecialization ; Pfeffer's objection, based on smallness of species change, etc.

Some of the items here indicated may be comparatively small : but it is not a small matter that Natural Selection has, e.g., no explanation of the overspecialization of parts, such as in the case of the *Kallima*, the "dead-leaf butterfly" of Malayan and south-tropical regions. It was, and perhaps still is, one of the most famous illustrations of protective mimicry, supposed to be brought about by Natural Selection ; but Prof. Kellogg says :—

" The four wings combine to resemble with absurd fidelity a dead leaf still attached by a short petiole to the twig or branch. I say absurd, for it seems to me the resemblance is over-refined. Here for safety's sake it is no question of mimicking some one particular kind of other organism or inanimate thing in Nature which birds do not

molest. It is simply to produce the effect of a dead leaf; any dead leaf; a brown withering leaf on a branch. Leaf-shape and general dead-leaf colour scheme are necessary for this illusion. But are these following things necessary? —namely, an extraordinarily faithful representation of mid-rib and lateral veins, even to faint microscopically-tapering vein tips; a perfect short petiole produced by the apposed 'tails' of the hind wings; a concealment of the head of the butterfly so that it shall not mar the outlines of the lateral margin of the leaf; and, finally, delicate little flecks of purplish or yellowish brown to mimic spots of decay and fungus-attacked spots in the leaf (!) and, as culmination, a tiny circular clear spot in the fore-wings (terminal part of the leaf) which shall represent a worm-eaten hole, or a piercing of the dry leaf by flying splinter, or the complete decay of a little spot due to fungus growth! A general and sufficient seeming of a dead leaf, object of no bird's active interest, yes—but not a dead leaf modelled with the fidelity of the wax-workers in the natural history museums."

Natural Selection should have stopped far short of this: but

"Kallima continues its way, specifically and absurdly dead-leafwards, until to-day it is much too fragile a thing to be otherwise than very gingerly handled by its rather anxious foster-parents, the neo-Darwinian selectionists" (pp. 53 and 54).¹

¹ One of Prof. Kellogg's most amusing illustrations concerns the femur (thigh bone) of the whale. This bone is now, say, 1 oz. in weight, or one-millionth part of the weight of the body. But the femur is, on evolutionary assumptions, an atrophied bone on its way to yet smaller dimensions. Imagine that femur, then, when it was 2 oz. in weight, and try to conceive what possible advantage there was accruing to the whale in the Struggle for Existence with other whales which the diminution of 1 oz. in the weight of its femur gave to it! It certainly is a *reductio ad absurdum* of this part of the Darwinian theory.

Perhaps I may here instance a case of mimicry, the so-called protective colouring, which is of a striking character and is clearly not explicable by Natural Selection. It occurred in my own garden some years ago at Plymouth. I had planted there a special Dahlia tuber, which had been sent to me from Ipswich. The colour of the flowers was a pure white with a vivid yellow centre. One morning when looking at the plant I found upon it a caterpillar white in colour with a vivid splotch of yellow upon the centre of its back! Manifestly it was not natural selection but some other force which had suddenly created the striking agreement of colour scheme between the flower and the caterpillar. I have never seen any such caterpillar before or since, and though perhaps such a caterpillar species exists it certainly did not exist in my garden and stray on to my dahlia.

It is no small matter that Natural Selection cannot explain "overspecialization," nor is it a small matter that Natural Selection does not explain how structures decay, nor that it does not explain the survival of "vestigial structures," nor that it does not explain the existence of useless but peculiar powers, nor that it does not explain harmful developments, which on the Darwinian theory require long periods of time to develop them but issue in death and extinction in the yet longer run. To these last Prof. Kellogg refers more than once in his volume, as for instance on page 53 and page 146. Indeed, the function and scope of Natural Selection has been so steadily reduced that even Professors Geddes and Thomson, determined Darwinians as they are, can only say:—

" Natural Selection remains still a *vera causa* in the origin of species: but the function ascribed to it is practically reversed. It exchanges its former supremacy as the supposed sole determinant among practically indefinite possibilities of structure and function for the more modest position of simply accelerating, retarding or terminating the process of otherwise determined change. It furnishes the brake rather than the steam or the rails for the journey of life: or, in better metaphor, instead of guiding the ramifications of the tree of life it would in Mivart's excellent phrase do little more than apply the pruning hook to them. In other words, its functions are mainly those of the third Fate, not the first—of Siva, not of Brahma " (pp. 247 and 248).

One reads their excellent book, with its ardent discipleship and its eulogies of Darwin, right on to this its close, and then can but sigh, " How are the mighty fallen in the midst of the battle ! " We need not be afraid of the admission, which Lodge also makes, that " Natural Selection is a *vera causa* so far as it goes." It goes but a little way: and Prof. W. B. Scott, professor of Geology and Palæontology at Princeton University, in his " Theory of Evolution," p. 25, expresses the conclusion which is now so widely shared, each in his own department, by men of Science: " Personally, I have never been satisfied that Darwin's explanation is the rightful one. To one who approaches the problem from the study of fossils, the doctrine of Natural Selection does not appear to offer an adequate explanation of the facts."

iv. And yet further, Darwin's theory had as another of its main supports the assumption of the " Struggle for Existence"—and Spencer's telling phrase, " The survival of the fittest in the struggle for

existence," expressed the Darwinian idea better than did Darwin's own terms. The gladiatorial combat was of the essence of the theory. But it has come steadily to be perceived how extraordinary it is to present life simply as a continual struggle among individuals. A vast change passes upon the scene of the supposed gladiatorial combat when the individual is seen to be subordinate to the tribe or species, within which mutual helpfulness is a far stronger characteristic than strife. "Biology," says "Chambers' Encyclopædia," in its article "Evolution," "is undergoing a revolutionary change."

"In thinking of a species we have been wont to call up and investigate the individual type, and to recognize the process of reproduction subsequently only as giving to us a more or less varied repetition of this type. But this is a survival of the static and atomic view. To-day what physiologists and evolutionists are coming to keep in view is primarily the living continuity of the species, not details of individuals and links between species. The variations of individuals are merely 'the by-play of ovum-bearing organisms.' So sex and reproduction, and the *general* characteristics of the whole species come first, and the variations which count most are those which best give continuity to the life of the species."

This makes a vast difference to the spirit of the dream. Very clearly it tends rather toward the fixity of species than their transmutation. But, passing over that for the moment, the changed outlook makes a difference so vast that it is simply "of obligation" to point out that this fourth main feature of Darwinism, the Struggle for Existence, while still recognized as one factor in actual exis-

tence, takes such a subordinate place that Darwinism proper is submerged. Mutual defence and the Ambulance Corps for the fallen, are more prominent than the relentless battle. "The view of Evolution thus reached," say Profs. Geddes and Thomson ("Evolution," p. 247), "is that of definite variation: its branches essentially dichotomous rather than indefinite, with progress essentially through the subordination of individual struggle and development to species-maintaining ends. The ideal of Evolution is thus no gladiatorial show, but an Eden; and though Competition can never be wholly eliminated—the line of progress is thus no straight line but at most an asymptote—it is much for our pure natural history to see no longer struggle but Love as 'creation's final law.'" One can but wonder what Darwin himself would have thought, and probably said, when he read this, had it been written in his own day, and not by two of his supposedly ardent disciples in our own time. Tennyson was a strong Darwinian and correctly expressed the view upon which Darwinism based itself. What of Man, he asks,

Who trusted God was love indeed
And love creation's final law—
Though Nature, red in tooth and claw
With ravine, shrieked against his creed ?

Now we have left this blood-stained Nature quite in the background; instead we are asked to enter Eden and watch the development of species under the ægis of Love—and it is still called Darwinism! It does certainly raise our view of human nature,

and of the fidelity of the scientific mind. But the old name does not blind us to the presence of an entirely new thing.

Thus the principal features of the Darwinian theory have all of them either been set aside or so much modified that they are hardly recognizable. The heritability of acquired characters, commonly now called modifications, is almost universally denied ; Darwin's theory of Pangenesis no one accepts and Weismann's denial of their heritability is triumphant, and the only Variations which are admitted to be always or at least generally heritable are those that spring from the germ-plasm of the parent organism itself. This change of view leads us away from that mechanical explanation of origins to which Darwinism gave such strong support (in spite of Darwin's original leanings to a Christian or at least a theistic explanation), and brings us right back to Theism and a superintending Intelligence working out the plan of Life. In the second place, Darwin laid all his emphasis upon continuous extremely slight Variations, whereas it is now seen that these probably never originate new Varieties, which probably always come *per saltum*, springing suddenly into being. Thirdly, Natural Selection of favoured races in the struggle for life has become clearly inadequate to explain multitudes of the facts which need explanation, and is relegated by Evolutionists to an entirely subsidiary position, and carelessly admitted to be “*a vera causa* as far as it goes.” Shorn of its pretensions, the doctrine of the survival of the favoured races is seen to be a truism helping hardly at all to

account for the diversity of Species. It was of Natural Selection that Huxley exclaimed, "How simple; and how stupid of us not to have thought of it before." And fourthly, the Struggle for Existence, if not entirely superseded, takes a place quite secondary to co-operative efforts to preserve the existence of the Species. We are requested to leave the gladiatorial arena and enter the Eden of helpful love.

v. Finally, whereas Darwin imagined old species to be transmuted into new ones by the accumulation of small helpful variations, no instance of any such transmutation has ever been observed.

The revolt from Darwinism is complete. It has been a valuable stimulant, but it is now known not to be a food. It is not part of the enduring substance of human thought.

CHAPTER VII

SOME VERDICTS OF EMINENT SCIENTISTS: IN CONTRAST WITH THE POPULAR TEACHING

WHAT remains of Darwinism? When such rejections have taken place, such changes passed upon feature after feature, is there anything really still left to us? That question can best be answered by the verdicts of eminent men of science: but meantime can we wonder that the world to-day begins to ring with the assertion that Darwinism is dead, even if it is not already buried?

What, then, do men of science say? Let me begin with the declaration of Prof. N. S. Shaler, professor of Geology at Harvard, made just before his death, that "The Darwinian hypothesis is still essentially unverified." It is the very least that can be said. ("The International Quarterly," 1st Quarter, 1903.)

Prof. Virchow, of Berlin, said that "the attempt to find the transition from the animal to Man has ended in total failure"; and that Darwinism was at its summit when "The Origin of Species" was published and had been declining ever since. Dr. Rudolph Otto, in his "Naturalism and Religion," thus summed up the position some years ago, especially with reference to Virchow. (pp. 106-

III.) " Apart from all apologetic attempts either in religion, ethics, or æsthetic interests ; apart too from the superior attitude of the philosophers, who have not so to speak taken the theory very seriously but regard it as a provisional theory, as a more or less necessary and useful method of grouping our ideas in regard to the organic world ; there are even among the biologists themselves some who . . . hold aloof from evolutionist generalization. . . . The true type of this group is Virchow . . . who threw the whole weight of his immense learning—ethnological, and anthropological, osteological, and above all craniological—into the scale against the Theory of Descent and its supporters." Fixing his attention especially upon the point of central importance, viz. human descent, Virchow declared the skull of Man and monkey to be fundamentally different—in externals, crests, ridges, and shape, and especially in the nature of the brain cavity. The so-called ape-like structures in the skull and the rest of the body, which occasionally occur in Man (idiots, microcephaloids, etc.), cannot, Virchow affirmed, be regarded as atavisms and therefore proofs of the Doctrine of Descent ; but are pathological, and therefore " *sui generis*," and " not to be placed in a series with the normal results of evolution." A man, modified by disease, " is still thoroughly a Man, not a monkey." Thus it was that Virchow dealt with " *Pithecanthropus Erectus*," " *Neanderthal Man*," and the cave jaw of Schipka in Moravia. He absolutely denied every contention of Dubois, the discoverer of the bones labelled " *Pithecanthropus Erectus*," at the Ethnological

Society in 1895 ; and in regard to Darwinism he not only denied descent from the monkey type but any racial variation in " *Homo Sapiens*," i.e. in the Human Race. Types are fixed : and " as yet no diluvial discovery has been made which can be referred to a man of the pithecid type " (" *Naturalism and Religion*," pp. 106-111).

Prof. Edward von Hartmann said : " In the first decade of the twentieth century it has become apparent that the days of Darwinism are numbered." ¹

Prof. St. George Mivart refers to the Darwinian theory as " a puerile hypothesis."

Dr. Etheridge, the fossilologist, and famous curator of the Natural History Museum, is reported to have said : " In all this great Museum there is not a particle of evidence of the transmutation of species. Nine-tenths of the talk of Evolutionists is sheer nonsense, not founded on observation, and wholly unsupported by facts. This Museum is full of proofs of the utter falsity of their views." This is a very striking pronouncement from the curator of a Museum which immediately upon the visitor's entrance presents to his gaze a very large and striking statue of Charles Darwin. It was given in answer to a question from Dr. George E. Post (*vide* " *The Other Side of Evolution*," by Rev. A. Patterson, p. 9).

¹ Dr. Townsend, in his booklet, " *The Collapse of Evolution* " asserts that Prof. Hartmann having stated that " the origin of species by minimal changes is possible," and that " thus far the theory of descent is safe," a small army of scientists and scholars entered into controversy with him, maintaining special creation (p. 52).

Prof. L. S. Beale, who for sixty years, 1837 to 1897, was Professor and Fellow of King's College, London, asserts: "The idea of any relation between the now living, by gradual advance of lifeless matter to the lowest forms of life, and so onward to the higher and more complex, has not the slightest evidence from any facts of any section of living nature of which anything is known. There is no evidence that Man has descended from, or is, or was, in any way specially related to, any other organism in Nature through Evolution or by any other process. In support of all naturalistic conjectures concerning Man's origin, there is not at this time a shadow of scientific evidence" (from an Address, 1903).

Again, in his little book "Vitality" (1901) the same Prof. Beale says: "If men would think for themselves, instead of accepting impossible hypotheses about Evolution and Environment, Struggles for Existence, and 'laws' of physical life, of which there is none, they would adopt more reasonable views about life in general and human life in particular." And again: "Swallow and sparrow might be supposed to have been undergoing changes in structural detail for hundreds of years and in many different directions; and nevertheless be (i.e. are) as unquestionably swallow and sparrow as they were before the departure from an early known form commenced. So also we have had during many centuries numerous modifications in pigeons, dogs and men, and the powers of variation are by no means yet exhausted, although the widest departure from the original type does not pass beyond

pigeon, dog and Man, or approach any other type of organism" (p. 60). And again, "The further I have been able to penetrate into the inner secrets of living nature and the processes of vital movement and structure formation, the more impossible have I found it to accept, as of general application to the life world, the doctrines of Darwin, or the very positive data of Huxley and Tyndall. . . ." (p. 73).

Prof. William Bateson, Professor of Biology at Cambridge, is probably the foremost authority upon evolutionary questions in the English-speaking world. In his great work, "Material for the Study of Variation," 1894, he finds Natural Selection still a *vera causa*, and Darwinism a great truth. But in 1909, in his contribution to the Darwin Centenary Volume, "Darwin and Modern Science," not even the inevitable allurement of the occasion could remove from his contribution the continual note of doubt and disappointment, and the final paragraph of his Essay is very significant, inasmuch as he there virtually admits that Darwinism has been left behind: "No one can survey the work of recent years without perceiving that evolutionary orthodoxy developed too fast, and that a great deal has got to come down: but this satisfaction at least remains, that in the experimental methods which Mendel inaugurated we have means of reaching certainty in regard to the physiology of Heredity and Variation, upon which a more lasting structure may be built."

Five years later, when President of the British Association, his Presidential Address shows that he

had become a far more determined opponent of the Darwinian hypothesis. He said :—

“ I suppose that every one is familiar with the theory of the Origin of Species which Darwin propounded. Through the last fifty years this theme of the Natural Selection of favoured races has been developed and expounded in writings innumerable. Favoured races certainly can replace others. The argument is sound, but we are doubtful of its value. For us that debate stands adjourned. We go to Darwin for his incomparable collection of facts. We would fain emulate his scholarship, his width, and power of exposition, but to us he speaks no more with philosophic authority. We read his scheme of Evolution as we would that of Lucretius or of Lamarck, delighting in their simplicity and courage.”

It would not be easy to surpass this in the definiteness and almost scornfulness of its dismissal of Darwinian Evolution : but the words which Mr. Philip Mauro quotes in his “ Evolution at the Bar,” from an address delivered in Toronto in 1922 show that his rejection of Darwinism is even stronger to-day than in 1914 : “ It is *impossible* for scientists longer to agree with Darwin’s theory of the origin of Species. No explanation whatever has been offered for the fact that, after forty years, no evidence has been discovered to verify his genesis of species.”

Prof. Dennert, in his little book, “ At the Death-Bed of Darwinism,” adduces much evidence to show the widespread rejection of Darwinian ideas in Germany. Among many testimonies given he omits that of the arch-Darwinian, Haeckel. Yet it is most striking. Haeckel said : “ Most modern investigators of science have come to the conclusion that

the doctrine of evolution, and particularly Darwinism, is an error and cannot be maintained." He then names several "bold and talented scientists" (including Dennert) who have not only abandoned Darwinism but also Evolution. This is not precisely the position of Dennert, who admits Evolution to be a theory worthy of investigation, but denies that it has been in any sense *established*.

Perhaps it is worth while to add the words of Dr. W. Haecke, the zoologist of Jena, the home of Haeckel: "We, the younger men, must free ourselves from the Darwinian dogma, in which respect quite a number of us have been quite successful." And Dr. Haecke also said that in his early years von Baer, the eminent zoologist and anthropologist, came near adopting the hypothesis of Evolution into his system, but that at a later date he utterly rejected it (quoted in "The Other Side of Evolution," pp. 9 and 10).

Sir J. William Dawson, the great geologist, said of the doctrine of Evolution: "It is one of the strangest phenomena of humanity; it is utterly destitute of proof." ("Story of the Earth and Man," p. 317.)

The well-known Swiss geologist, Barrande, emphatically repudiated the theory of Evolution: and Prof. Dana is reported to have said: "If ever the links (upon which the doctrine of Evolution depends) had an actual existence, their disappearance without a trace left behind is altogether inexplicable."

Prof. W. B. Scott, Professor of Geology, of Princeton, U.S.A., says: "Personally I have never been satisfied that Darwin's explanation is the

rightful one. To one who approaches the problem from the study of fossils, the doctrine of Natural Selection does not appear to offer an adequate explanation of the observed facts" ("The Theory of Evolution," pp. 25 and 26). He continues: "On the other hand, if Darwin's hypothesis be rejected, there is, it must frankly be stated, no satisfactory alternative to take its place?"

Prof. G. F. Wright, of Oberlin College, Ohio, an eminent geologist, in his "Introduction" to Patterson's "The Other Side of Evolution," p. xix, says: "The doctrine of Evolution, as it is now becoming current in popular literature, is one-tenth bad science and nine-tenths bad philosophy." Prof. Wright's Introduction to such a book makes his hostility to the theory of Evolution quite plain.

Thus it is clear that not only the particular Darwinian theory is widely rejected, but also the theory of Evolution itself. To the question of Evolution apart from the Darwinian theory, viewed as a general theory of Descent, I shall return in a subsequent chapter. Has it any value? Is there any substance in it? Is it anything more than the empty shell of a discredited theory? As a matter of fact, Evolution as a substantial theory, with content and definite specific *meaning*, is shut up to Darwinism. When that has gone there is nothing left of its substance. There is nothing to take the place of Darwinism. No other theory has won any general acceptance. The most widely accepted is the Mutation Theory of Hugo de Vries, of Amsterdam, a theory closely akin to the Doctrine of Special Creation, which will be dealt with later.

Meantime, to make quite clear that Darwinism has gone and that nothing takes its place, two other testimonies from two of the leading exponents of evolutionary theory, Prof. Kellogg and Dr. Henry Fairfield Osborn, curator of the Geological Section of the New York Natural History Museum, are of special value—since they come from men who are heart and soul in the evolutionary movement, but are compelled by facts to give a definite and hostile verdict.

Prof. Kellogg says: “The fair truth is that the Darwinian Selection theories, considered with regard to their claimed capacity to be an independently sufficient mechanical explanation of descent, stand to-day seriously discredited in the biological world. On the other hand, it is also fair to say that no replacing hypothesis or theory of species-forming has been offered by the opponents of Selection which has met with any general or even considerable acceptance by naturalists” (“Darwinism To-day,” p. 5).

So also Dr. H. F. Osborn says: “Between the appearance of the ‘Origin of Species’ in 1859 and the present time there have been great waves of faith in one explanation and then in another; each of these waves of confidence has ended in disappointment until finally we have reached a stage of very general scepticism” (“The Origin and Evolution of Life,” Preface, p. x). After saying that we “know” that the one-toed horse had a four-toed ancestor, and that Man “has descended from an ape-like form somewhere (*sic!*) in the Tertiary,” he goes on to say: “We do not know their intervening causes, for none of the explanations which have in turn

been offered during the last hundred years satisfies the demands of observation, experiment and reason. It is best frankly to acknowledge that the chief causes of the orderly evolution of the germ are still entirely unknown, and that our search must take an entirely fresh start. . . . This confession of failure is part of the honesty of scientific thought" (Preface). And again he says: "If, however, we reject the vitalistic hypothesis of the ancient Greeks, and the modern vitalism of Driesch, of Bergson and of others, we are driven back to the necessity of further research, observation and experiment, guided by the imagination and checked by verification. As indicated in our Preface, *the old paths of research have led nowhere*, and the question arises: What lines shall new researches and experiments follow?" (*ibid.*, p. 10. The italics are mine).

It is worthy of the most careful attention that some of these opinions reveal that not only Darwinism but also Evolution itself (i.e. as a vague "doctrine of descent") is widely rejected. For the moment, however, it is sufficient to note that this somewhat lengthy list of quotations from eminent men of science shows how widely the collapse of Darwinism is realized to-day, and how many men of science can no longer accept it. Yet there is no small confusion in the public mind at the present hour. The Darwinian hypothesis continues to be advanced in books and articles as if it were universally accepted by all educated and intelligent men.¹

¹ Dr. Barnes, the Bishop of Birmingham, has repeatedly in articles and interviews affirmed Darwinian views: and has maintained the universal acceptance by "competent

That theory, or at the very least the evolutionary conception which it has done so very much to establish, is the basis of most of the theological works of our day, and of that theological movement called the "Higher Criticism" which is directed against what may be called the creationist conception of the origin of Scripture. Yet Lord Kelvin said :—

"I marvel at the undue haste with which teachers in our Universities and preachers in our pulpits are re-stating truth in the terms of Evolution, while Evolution itself remains an unproved hypothesis in the laboratories of science." (Quoted by Dr. Griffith-Thomas in his pamphlet "Evolution and the Supernatural.")

The continued prevalence of Darwinism in popular scientific circles is curious and puzzling, but probably the explanation lies in the fact that Evolution without *a method of evolution* is quite too vague a thing to rest upon, and for a method of Evolution it is Darwinism or nothing. Thus, being quite certain of Evolution in their own minds, and having no alternative method, they are shut up to Darwin. But as a matter of fact, it was Darwin who made them so certain of Evolution! Darwin's theory of Selection it was, as is admitted, that gained for Evolution its acceptance. Hence we find the same merry-go-round of argument which not infrequently occurs in evolutionary affairs. *First, Darwin makes them certain of Evolution, and then Evolution makes*

biological specialists" of the evolutionary theory. These are merely examples out of a thousand similar unverifiable statements.

them certain of Darwin. It is another echo of the old evolutionary song, "Here we go round the mulberry tree."

The really serious fact, however, to be noted in this connection is that Darwinism still seems to be the most common mental pabulum provided for children in educational and semi-educational books.

In illustration of this let me give a few quotations from "The Children's Encyclopædia" to show the sheer matter-of-fact emphasis with which the theory of Darwinism is presented to the children.¹ First, let me quote some statements of the evolutionary origin of the lower creatures. Thus:—

"Once all the creatures lived in the sea and rivers. Some lived in shells. Others were soft things like jelly and had no backbones. These had all the sea to themselves for a very long time. But during this time they were growing into separate families, unlike those which had gone before. Proper fish began to swim about, and there were great sea scorpions, as big as a tall man, and fishes with skins made like armour.

"After these there grew up great creatures which could live in the water or out of the water, as the hippopotamus can to-day. Then came enormous reptiles. We have nothing living now like the reptiles which by slow degrees

¹ Of this Mr. Philip Mauro gives also a strikingly "scientific" instance. In a "Home Geography for Primary Grades" there is a discussion of birds, and the book declares: "Ever so long ago their grandfathers were not birds at all. Then they could not fly, for they had neither wings nor feathers. These grandfathers of our birds had four legs, a long tail, and jaws with teeth. After a time feathers grew on their bodies, and their front legs became changed for flying. These were strange-looking creatures. There are none living like them now."

came into existence millions of years ago. . . . From some of the flying monsters came the birds, and still later came animals which, instead of scales, had hair to cover them. . . . Little by little the animals and the birds changed until they became the kind of creatures that are now living, and then millions of years after the lower animals came Man" (pp. 26 and 28).

"It seems very hard to believe that the birds with their lovely plumage and their sweet song, came from ugly reptiles" (p. 28).

"Think of the humming bird, that tiny beauty, not much bigger than a good-sized bee, and remember that it is descended from a monster called the Iguanodon, which had a great head like a lizard a yard in length. It had a great tail, and enormous hind legs, with shorter ones in front: and when it reared itself on its hind legs the height of his head from the ground was fourteen feet" (p. 29).

Let these quotations suffice for the lower animals and their evolutionary beginnings! What audacity is here displayed! To one who knows what many leaders of scientific thought in this realm are actually saying it is simply incredible that these statements should thus be made, so confidently as simple matters of fact, as if there were no question about them at all. But let us now come to the crown of creation, Man, and see what the children are taught to believe about him:—

"Now in the northern part of this vast district—as, for instance, in the Islands of Sumatra and Borneo—we find some wonderful kinds of monkeys, of which we may see some living specimens at the Zoological Gardens in London any day. These, we can prove, are more closely related to our ancestors than any other living creatures in the world. So it is possible that long ages ago the ancestors of mankind lived on this lost continent, and that there mankind first saw the light." (p. 3,005.)

"The orang-utan is a reddish brown. These apes have brains *not quite equal* to those of the lowest savages, the wild men of Australia, and those savages who lived in the middle of Tasmania until the middle of last century." (p. 579. The italics are mine.)

"We know that the highest kinds of apes have a sort of language, and that makes it probable that the earliest men had a language also. Indeed, many people think that language, or speech, is exactly the thing that makes Man, and that Mankind, therefore, came into existence exactly when the ancestors of men became developed into beings that could talk." (p. 3,978.)

I do not stop to criticize. For instance, the passage about the brain of the ape and the brain of the lowest savage is thoroughly unscientific.¹ The children of the Australian Aborigines in two or three years equalled the children of the English in mental achievement. My point is this: It is clear from these brief quotations that the ape-like ancestry of Man is stated and assumed quite as a matter of fact in the pages of these children's books; and to clinch the matter in the children's minds pictures are given. Thus, at the beginning of Vol. I, on page 31, we have a series of pictures illustrating the development of forms of life upon this planet. The last picture represents Man.

"The first men lived in trees and caves, with the wild animals about them, and it has taken thousands of years for men to learn how to build houses and tame animals and make fires. . . ."

Then, again, in the same volume but at the end,

¹ Darwin in the "Descent of Man" admitted the immense gap in weight of brain between the highest anthropoid and the lowest Man.

page 623, we have a further series of pictures. We read:—

“These pictures show the first kind of buildings that men made. At first they were, perhaps, simply huts in trees or holes in the ground.”

Thus Darwin's conception of the origin of Man is continually reproduced. It will perhaps be useful here (as he is very frequently misquoted) to place a summary statement of his theory respecting the Human Race. Darwin assigned both to Man and the ape one common ancestor, “the early progenitor of the whole simian stock, including Man” (“Descent of Man,” pp. 239 and 240). We must not suppose that he was identical with, or even closely resembled, any existing ape or monkey. From him proceeded “the two main divisions of the Simiadæ, namely, the Catarhine monkeys (of the Old World) and the Platyrrhine monkeys (of the New) with their sub-groups.” (p. 238.) Darwin thought we might “imagine three lines of descent proceeding from a common stock,” and regarded it as “quite conceivable that two of them (i.e. the Simiadæ and Lemuridæ) *might* after the lapse of ages be so slightly changed as still to remain as species of the same genus, whilst the third line *might become* (italics are all mine) so greatly modified as to deserve to rank as a distinct sub-Family, Family, or even Order (i.e. Man)” (pp. 235 and 236). In any case, the common stock from which Man is descended is “a hairy, tailed quadruped, probably arboreal in its habits, and an inhabitant of the Old World. This creature, if its whole structure had been examined by a

naturalist, would have been classed among the Quadrupeds, as surely as the still more ancient progenitor of the Old and New World monkeys." (pp. 930 and 931.) Darwin's next stage back is from this ancient progenitor to "an ancient marsupial animal" (p. 931); the next stage to "some amphibian-like creature" (p. 931); the next, to "some fish-like animal" (pp. 244 and 931); and the final stage to an animal "which seems to have been more like the larvae of the existing marine Ascidiants than any other known form" (p. 931, etc.). The Ascidian, often called the Sea-Squirt, belongs to the order Tunicata. It is a little creature found in the muddy sea-beds of the Mediterranean, and in early life swims freely. But in later life it becomes fixed to a rock or stone at one end, and draws in nutriment at the other. Pope's couplet describes it then with accuracy (only Pope is describing something else) :—

Fixed like a plant to its peculiar spot
To draw nutrition, propagate, and rot.

It is a very far flight, possible only to an absolutely unrestrained imagination, and quite alien to the scientific passion for *proven facts*, which finds Man's ancestor in the Ascidian. None the less, the Darwinian Chorus still sings loudly. Leading men of science declare the impossibility of the whole Darwinian position; but Mr. Edward Clodd twenty years ago, and Mr. H. G. Wells to-day, are leaders of a mighty popular Chorus, still chanting this very imaginative and entirely unproven Darwinian theory of Man.

CHAPTER VIII

THE REAL VALUE OF THE WORK OF DARWIN: UNCONSCIOUS ADMISSIONS OF DARWINIANS, AND TESTIMONIES OF EVOLUTIONISTS

THE continued affirmation of the Darwinian theory, in spite of its scientific rejection, presents a perplexing position, and it is difficult to escape the conclusion that the wish is the father to the thought: for it certainly seems at times that the popular writers attracted by the theory are enthusiastic in their advocacy, while the popular writers repulsed by it are intense in their opposition—and both sides without any very plain acquaintance with the position. But all perplexity should cease when we listen to the estimates of those whose strong bias is Darwinian, and some of whom call themselves by his name still. The evidence may well be claimed as decisive when those speak who have the strongest bias toward Darwinism, and are authorities in the realms of Science: but who, like others whose words I have been quoting, share that loyalty to fact which is the glory of the scientific mind. It is not the criticism of the opponent so much as the eulogy of the friend which should reveal to the world that Darwinism is no longer a living theory. The truth is that the second of the only two

explanations of the method of the world's Becoming is no longer a tenable explanation : and this is the fact which looks out from between the lines of the eulogies of the most determined so-called Darwinians. Sometimes it looks out within the lines as well as between them. Thus Profs. Geddes and Thomson are valiant exponents of Darwinism in that volume of the Home Universities Library which I have several times quoted. To them, Darwin is still "The Master." It is therefore significant that they, like Prof. Kellogg in his "Darwinism To-day," are evidently resolved that Evolution must stand although Darwinism fall. In the midst of their advocacy they prepare us for the fall. Thus, in their Introduction (pp. viii and ix), they define Evolution only in the vaguest way as "orderly change."

" Yet ideas of unity amid diversity, of order amid change, have also long been growing, even finding expression, and this not merely, as sporadically in all ages, in impressions and speculations on decline and on better things ; but in clearer and more comprehensive surveys of the processes of change, even inquiries into its method. These, in fact, have gone toward making up the general idea we now more or less share, of the universe as not only orderly but in process of change. Changing order, orderly change, and this everywhere—in nature inorganic and organic, in individual and in social life—for this vast conception, now everywhere diffusing, often expressed, rarely as yet applied, we need some general term—and this is Evolution."

To retreat thus to a conception of Evolution so vague and general that it can hardly be claimed that the term has any content—certainly no more content than it had 2,000 years ago—is to reveal a sense of

the eclipse which has befallen Darwinism. For it was the definiteness which the Darwinian theories of Natural Selection, Pangenesis, and Sexual Selection gave to the vague evolutionary idea which made evolution a vital factor in modern thought. Thus Prof. August Weismann, Professor of Zoology in the University of Freiburg, says in his *Essay in "Darwinism To-day"* (p. 18) : "Many and diverse were the discoveries made by Charles Darwin in the course of a long and strenuous life, but none of them has had so far-reaching an influence on the science and thought of his time as the theory of Selection. I do not believe that the theory of Evolution would have made its way so easily and so quickly after Darwin took up the cudgels in favour of it, if he had not been able to support it by a principle which was capable of solving in a simple manner the greatest riddle that living Nature presents to us—I mean the purposiveness of every living form relative to the conditions of its life and its marvellously exact adaptation to these." Darwin's special contribution was a definite principle, able apparently to solve the riddle ; and to fall back again to the mere ancient Greek idea of the world as changing in an orderly fashion would not be necessary in the twentieth century if Darwin's simple and definite theories had justified themselves. It is an unconscious and fatal admission.

So, again, it is impossible to escape the significance of page 227, where Geddes and Thomson declare their conception of "the true Darwinian."

" Yet we must test all anew in the field ; for by our fresh glimpse of theoretic light the whole world must

be reviewed afresh, and our new light-ray tested in turn for all it may be worth as well as for all it can reveal.

"The true Darwinian is thus not he who longest swears by the word of the master, and stretches some classic adaptations, say of flower and insect, towards its breaking-point; but he who with a social philosophy advanced beyond that of Darwin's teacher, Malthus, goes forth anew into the field."

So Darwinians need not swear by the word of Darwin, but *test Darwin's light-ray to see what it is worth!* Moreover, it is even more full of significance that our Professors discover new authorities in the realm of Biology to whom they concede priority of place, viz. *the nature-poets!* Nothing could show more plainly a sense that the scientific precision, which it is claimed Darwin so signally introduced into the evolutionary field, has failed.

"The secret of life is baffling to the human intelligence, refusing to be formulated. Often the conception of Life has seemed to biologists to be within reach, and then it is perhaps farthest away. It recedes as we approach. Yet, tho' intelligence fails, do we not at times come nearer to it by sympathy? Wordsworth, Emerson, Meredith, these and many other Nature-poets are perhaps the truest, because deepest, biologists of us all" (p. 202).

So, too, does Prof. Kellogg write, in acknowledgment that Darwin no longer holds the position he was once deemed to hold. He does not hail the nature-poets as the deepest biologists of all, but calls for an increased amount of the most exact observation. He acknowledges the widespread eclipse of Darwinism ("Darwinism To-day") :—

"To many general readers Darwinism is synonymous with organic evolution or the theory of Descent. The

word is not to be so used or considered. Darwinism, primarily, is a most ingenious, most plausible, and, according to one's belief, most effective or most inadequate causo-mechanical explanation of adaptation and species-transforming." (p. 2.)

"The fair truth is that the Darwinian Selection theories, considered with regard to their claimed capacity to be an independently sufficient mechanical explanation of descent, stand to-day seriously discredited in the biological world. On the other hand, it is also fair to say that no replacing hypothesis or theory of species-forming has been offered by the opponents of Selection which has met with any general or even considerable acceptance by naturalists." (p. 5.)

When an evolutionist like Kellogg, of strong Darwinian sympathies, can speak of Darwin's theories as "*most ingenious, most plausible*, and *most effective or most inadequate*," such adjectives bear eloquent testimony to a changed view of Darwin's work.

Whether I should be right in classing Prof. Hoffding, Professor of Philosophy in the University of Copenhagen, as a Darwinian I do not know; but in any case he is a sufficient admirer of Darwin to be a contributor to the Memorial Volume, his subject being Darwin's influence upon modern philosophy. Much as Geddes and Thomson find Darwin a new light-ray by which we can re-examine the world, so Prof. Hoffding finds Darwin's value *not in his achievements so much as in the life and inspiration he has imparted to study and observation*. His words are worth quoting:—

"First of all, we must lay stress on Darwin's own personality. His deep love of truth, his wide horizon, his indefatigable inquiry, and his steady self-criticism, made

him a scientific model, even if his results and theories should eventually come to possess mainly an historical interest. In the intellectual domain the primary object is to reach high summits from which wide surveys are possible, to reach them toiling honestly upward by the way of experience, and then not to turn dizzy when a summit is gained. Darwinians have sometimes turned dizzy: Darwin never. He saw from the first the great importance of his hypothesis, not only because of its solution of the old problem as to the value of the concept of species, not only because of the grand picture of natural evolution it unrolls, but also because of the life and inspiration its method would impart to the study of comparative anatomy, of instinct, and heredity, and finally because of the influence it would exert upon the whole conception of existence. He wrote in his Note-book in the year 1837: 'My theory would give zest to recent and fossil comparative anatomy; it would lead to the study of instinct, heredity, and mind-heredity, whole (of) metaphysics'" (pp. 446 and 447).

That is the conception which Darwin modestly forecasted of the value of his own work, and which fifty years after the publication of the "Origin," Hoffding regards as the correct estimate. *It "gives zest" to scientific research!* A great achievement, but falling almost infinitely short of the solution of the age-long problem of Evolution! Hoffding goes on to say that four main points in which Darwin's investigations possess philosophical importance are "the energetic and thorough manner" in which he sets forth his hypothesis of evolution, the search for a foundation in definite fact, the manner in which "struggle for existence" and "natural selection" have laid hold of thought, and the characteristically English character of his thinking with reference to Morals. This is very thorough indeed, and can

hardly be said to let Darwin down lightly. It shows that Hoffding, with all his admiration for Darwin, regards his theories as unverified, and his real significance to lie in the stimulus he gave to evolutionary research. His theories may "come to possess mainly an historical interest." This is somewhat plain speaking for a memorial volume.

Just one further testimony of a similar kind would I draw from Prof. Bateson, Professor of Biology in the University of Cambridge. It is true, as I have shown above, that Bateson sees now the impossibility of the Darwinian hypotheses; but none the less it will be useful to note what in his memorial volume essay he regarded as the real claim of Darwin to the admiration of posterity. It is not "achievement," "finite accomplishment," but the initiation of a new method by which hereafter problems must be solved and by which a true understanding of the process of Evolution "may be developed."

"Darwin's work has the property of greatness in that it may be admired from more aspects than one. For some the perception of the principle of Natural Selection stands out as his most wonderful achievement, to which all the rest is subordinate. Others, among whom I would range myself, look up to him as the first who plainly distinguished, collected, and comprehensively studied, that new class of evidence from which hereafter a true understanding of the process of Evolution may be developed" (p. 85).

"Whether we glance back and compare his performance with the efforts of his predecessors, or look forward along the course which modern research is disclosing, we shall honour most in him not the rounded merit of finite accomplishment, but the creative power by which he inaugurated

a line of discovery endless in variety and extension " (p. 85).

And again :—

" But apart from the invention of this reasonable hypothesis, which may well, as Huxley estimated, ' be the guide of biological and psychological speculation for the next three or four generations,' Darwin made a more significant and imperishable contribution. Not for a few generations but through all ages he should be remembered as the first who showed clearly that the problems of Heredity and Variation are soluble by observation, and laid down the course by which we must proceed to their solution " (p. 88).

So, while Hoffding finds Darwin's value in the zest he gave to scientific research, Bateson finds it in the new method he introduced, and neither of them find it in his achievement. Bateson, indeed, thinks we have begun to study the origin of species too soon. We have vast arrears to make up in prior directions—notably in the matter of variation. To Darwin the question, What is a Variation? presented no difficulty. But we have frankly to say that the origin of Variation, whatever it is, is the origin of Species, and " of that origin not one of us knows anything." And whereas Darwin used the terms Species and Variety in a very uncertain manner, Bateson further declares that the term Species should probably have a " strict and concrete meaning in contradistinction to the term Variety," and the difference between them is more than one of degree. *All this is in reality to say with emphasis that Darwin in truth barely began an investigation which has as yet gone but a very little way.* All these revealing estimates of the true value of Darwinism may fitly be brought to a conclusion with the verdict

of Prof. A. C. Seward, the Editor of the Memorial Volume, "Darwin and Modern Science," who, in his Preface, puts Darwin's claim to the reverence of mankind not on the ground that he has discovered the origin of Species—that is frankly admitted to be doubtful, even in this memorial volume—but on the ground that by the publication of the "Origin of Species" the fundamental conceptions and aims of the students of living nature have been completely changed. Such eulogies are in themselves confessions of the failure of his efforts to establish this theory of Evolution.

CHAPTER IX

IS EVOLUTION, AS DISTINCT FROM THE DARWINIAN THEORY OF ITS METHOD, TO BE REGARDED AS ESTABLISHED ?

WE must, then, in all candour, regard the Darwinian hypothesis as left behind in the march of scientific and philosophic thought. But many of the Evolutionists, whose name is legion (including even men like Prof. Bateson, who declares Darwinism to be "impossible"), make two strong claims—first, that Evolution is independent of Darwinism ; and, secondly, that Evolution is firmly established. Can these two claims, or either of them, be accepted ? and if Evolution is established, what is the value of the doctrine ?

The first of these two claims may, in one sense, be at once conceded. The conception of Evolution, in the vague general sense in which, for instance, Geddes and Thomson define it as quoted above, is more than two thousand years older than Darwin and is, of course, quite independent of him. It has, throughout the course of this Essay, been repeatedly pointed out that the Darwinian Theory (embodying in itself the kindred ideas of Buffon, Erasmus Darwin, Lamarck and others) is only a theory of the *Method* by which the world of organic life has

come to be what it is. That Method has been adjudged inadequate to the task assigned to it : but still the evolutionary concept remains—the concept of a world ever moving and changing, though the method which governs its changes remains unknown.

In all fairness, however, three counterbalancing considerations must be borne in mind. The first is that without a proven method, nothing is really proven at all. In such a case as Evolution, the method is all the meat within the egg : the outline of the theory is merely the egg-shell. There is no substance in Evolution without a *Method* of Evolution. It is the mere empty shell of speculation.

The second is that it was Darwin who gave to Evolution its immense vogue. He found the doctrine the idea of a coterie : he made it at one time the passionate conviction of most of the scientific world. This is a veritable truism and not capable of disputation. Prof. Weismann declared it to be due to the simplicity of the principle which Darwin enunciated, and this is almost certainly true. Darwin substituted a simple and definite method for the vague intangible ideas of historic evolutionism. The cloud of evolutionary words suddenly narrowed down to the clear-cut line of Natural Selection. It was like a Homeric God, very human and intelligible, emerging from the Grecian clouds ; and the hungry intellect of mankind hailed it with enthusiasm. Samuel Butler, declared by Bateson to be “the most brilliant and by far the most interesting of Darwin’s opponents,” said : “To the end of time, if the question be asked, Who taught people to believe in Evolution ? the answer must

be that it was Mr. Darwin." (See also Prof. Chalmers Mitchell in "Encyclopædia Britannica," 9th Ed., article "Evolution.") Thus it is surely a strange claim, and a claim difficult to justify, that while Darwinism is rejected Evolution is firmly established still. It was upon Darwin's theory that Evolution was established as the explanation of things as they are. Upon Darwinism Evolution rested. Now the base is struck away. Darwinism is gone. Evolution returns very much to its old position in the clouds of the philosophic heaven. But we are still asked to believe that it is firmly established ! Darwinism, though overthrown, still firmly upholds the doctrine of Evolution ! It is certainly not self-evident that the failure of Darwinism makes no difference to the claim of the older doctrine. If Darwin has indeed firmly established the old doctrine, which 2,500 years of human thinking had not made good, that surely is his supreme claim to fame. But we require to know how the rejected Darwinian theory has accomplished this mighty work, and affirmation is in no sense proof.

The third thing which requires in fairness to be remembered is that Evolution is to-day quite generally regarded as equivalent to the Doctrine of Descent, or the derivation of all forms of life from one, or at most a few, original forms. It is this which ought to be intended when it is said that Evolution is firmly established. So, indeed, it often is : and yet we find sometimes the mere vague general idea of Evolution as "changing order, orderly change, and that everywhere, in nature organic and inorganic," advanced instead of the

Doctrine of Descent. Which of these two conceptions is it that we are asked to receive as firmly established although Darwinism has passed away? It will not do to have an ambiguous "Evolution," which wavers between the Doctrine of Descent, and mere "orderly change": to find ourselves perhaps admitting that the world under the eyes of many observers has been clearly seen to be a world of change and movement manifold, and thus in some sense a world of Evolution: and then to find that we are assumed to have admitted the truth of the Doctrine of Descent. It is not without great force and unquestionable necessity that Bergson protests in his "Creative Evolution" against the frequent ambiguity of evolutionary argument.

Certainly, however, one concept of Evolution remains after Darwinism has gone, viz. the concept of "changing order, orderly change, and that everywhere, in nature inorganic and organic, in individual and in social life." This concept, then, remains. Is it worth while to try to support it? Or is it worth while to try to disprove it? Suppose it to be the proven fact of life, has it any value? Is it really of sufficient moment to trouble about either one way or the other? What advantage to mankind can be found in the concept of a world in a state of flux, with no rigid lines of structure, rather than in the concept of a world in which indeed some movement can be perceived, but in which also rigid structural lines give a static quality? During the long period in which the evolutionary idea has existed do we find that it has actually proved its value as an instrument of progress or in any other

way? The answer appears to be that it is difficult either in theory or in experience to perceive the advantages which come from the concept of a fluent world. In theory modern men have come to the conclusion that it is to mankind's advantage to discover and count upon the Reign of Law: to know and to depend upon the fixed order of the world's procedure. The advantage to thought of a fixed order on which the mind can rest is hardly to be disputed. It is no small part of the difference between the thinking of a savage and the thinking of a scientist that the one imagines things happen without law and the other is confident that law is everywhere. It is difficult to see what except unsettlement of mind can result from the concept of a world not established, but always only in process of Becoming, when the *method* of that process is a deep mystery which so far entirely baffles the human mind. To conceive of the world as evolutionary without knowing the method of the evolution is simply equivalent to saying: "There are great changes taking place which we are not in any way able to understand." The advantage to thought of being baffled by the facts of observation is difficult to appreciate. It would surely be better to turn to realms where we are not baffled, and keep our evolutionary theories in reserve until we are able to give them a real content. Nor does Experience reveal any advantage which theorizing has chanced to overlook. Both in the ancient and in the modern period of marked evolutionary thinking, the names and the literature which gave no heed to Evolution are at least as great as those which

did. The men who accepted evolutionary ideas have not marked themselves out as superior in invention or discovery or achievement. Plato is not inferior to Aristotle: Homer, Æschylus and Virgil compare favourably with Ovid and T. Lucretius Carus: Browning is at least as great a name as Tennyson, and Carlyle and Ruskin will be great names in modern literature when there is no evolutionary name to even put beside them. The unsettlement of thought which evolutionary theorizing has brought is very great: it has eventuated already in such a portent as the foul immoralist Nietzsche: and it is quite evident that what the stricken world of to-day needs more almost than anything else is the settlement of thought upon some sure foundation. And if it be urged that Evolution has to its credit the present wonderful outburst of scientific observation and experiment, the answer is that it is not the old vague concept of Evolution, but the now discredited but very definite Darwinian theories to which that wonderful outburst has to be put down. It is difficult indeed to see what advantage Experience offers to us, as arising from the vague concept of Evolution, which can offset the incalculable disadvantage of unsettled thought.

We may therefore dismiss the vague old concept of Evolution as " changing order, orderly change," as being of too small moment to mankind—unless indeed it be a definite hindrance—to justify attempts to establish it, or, indeed, any further expenditure of human time upon it. But confining ourselves to the organic world, and to the definite sense of the word Evolution as the Doctrine of Descent, is it admissible

to claim that Evolution, though its method is unknown, is firmly established, or indeed, established at all? We may take leave to doubt the admissibility of the claim; and it is essential, even if in the briefest fashion only, to review the grounds upon which the claim is made and to estimate their real cogency. It will not suffice to see these grounds through a haze of Darwinian glory: for Darwinism is a light that failed.

The claim is based upon a number of considerations which may be placed in a kind of chronological order, ranging from the earth's fossil records down to the facts of Classification and the difficulty of distinguishing species from species because of seemingly intermediate forms. *The five chief considerations are palæontological, those concerned with rudimentary structures, embryological, anatomical and classificatory.* All five are of great interest and of real importance in the realm of knowledge; but neither singly nor collectively are they conclusive as establishing the Doctrine of Descent. The first is so limited and fragmentary and hostile in its character, and the remaining four so unquestionably capable of interpretation upon other grounds, that taken in their entirety their cumulative force falls far short of proof, and does not establish even a reasonable probability.

A. The *palæontological argument* from the fossil remains of the earth's strata has been stated in years gone by with the greatest confidence. Huxley went so far as to say that if zoologists and embryologists had not put forward the Doctrine of Descent, then palæontologists would have been forced to

invent it. Equally for many years the entire palæontological argument has been vehemently denied. The strong words of Dr. Etheridge, a palæontologist, have already been quoted—an absolute and indeed scornful negative to the whole palæontological claim. But now for some years past modesty has begun to characterize the claim of the palæontologist that fossil remains confirm the Doctrine of Descent. For instance, Prof. W. B. Scott, of Princeton, U.S.A., writing in the Memorial Volume, "Darwin and Modern Science" (p. 199), definitely as a Darwinian, declared "the main significance of the whole (of our palæontological knowledge) lies in the fact that *just in proportion to the completeness of the record is the unequivocal character of its testimony to the truth of the evolutionary theory.*" But eight years later Prof. Scott issued his volume, "The Theory of Evolution," in which his certainty that palæontological research is verifying the Doctrine of Descent is greatly clouded, for on pages 25 and 26 he says: "Personally I have never been satisfied that Darwin's explanation is the rightful one. To one who approaches the problem from the study of fossils, the doctrine of Natural Selection does not appear to offer an adequate explanation of the observed facts. . . . On the other hand, if Darwin's hypothesis be rejected, *there is, it must frankly be stated, no satisfactory alternative to take its place.*" Moreover, Prof. Scott also regards the Mutation Theory as inadequate, and twice over (pp. 27 and 82) warns us not to expect too much, especially from palæontology, and says that the ancestry of mammals is still a question of much uncertainty.

The claim of Mr. D. H. Scott, F.R.S., President of the Linænan Society, in his Essay in "Darwin and Modern Science," is very cautious, and well represents the position of the palæontologist who clings still to the Doctrine of Descent.

"At the present day the whole subject of palæontology is a study in evolution, and derives its chief inspiration from the ideas of Darwin and Wallace. In return it contributes something to the verification of their teaching; the recent progress of the subject, in spite of the immense difficulties which still remain, has added fresh force to Darwin's statement 'that the great leading facts of palæontology agree admirably with the theory of descent with modification through variation and Natural Selection'" (p. 222).

This is quite a cautious statement, and at the same time he twice points out that "the distinguished French palæontologists, Grand' Eury and Zeiller, are of opinion, to quote the words of the latter writer, that the facts of fossil botany are in agreement with the sudden appearance of new forms, differing by marked characteristics from those which have given them birth." This is not descent of the Darwinian character but Evolution *per saltum*, Evolution by leaps or by Mutations: and this is so widely different from Darwinism that Mr. Scott goes on to quote Darwin's significant words in the "Origin," viz.: "Under a scientific point of view and as leading to further investigation, but little advantage is gained by believing that new forms are suddenly developed in an inexplicable manner from old and widely different forms over the old belief in the creation of species from the dust of the

earth." ("Origin," p. 424, 6th Edition; p. 662 of the 1902 edition.)

Such is the much more modest attitude which characterizes the palæontologist of to-day. The evolutionary geologist is baffled by the inapplicability of Darwin's method to the facts so far as he has ascertained them, and seeks rather blindly for some other method. He seeks in vain. Evolution has no explanation to offer. He begins to admit that something almost creational is revealed by the geologic records. Other geologists, such as Dawson, G. F. Wright, and Etheridge—whose words are given above—entirely deny the validity of the whole evolutionary speculation.

The palæontologist who claims that fossil remains support the Doctrine of Descent, by Darwin's method or by some other, is faced by numerous contradictory facts.

(i.) He is faced by the fact that geological strata continually present us with the very forms which, ages after, remain unchanged upon the earth to-day. Somehow, evolution has not been at work upon these forms of life. This is a very disconcerting fact. Indeed, it is more than disconcerting; it is fatal. For instance, of the thirteen known Orders of the Class Crustacea, all save two are in existence to-day, and those two disappeared in the Carboniferous Period. Crustaceans are the dominant fossils of the Cambrian system. What this means as regards geologic time it is, of course, impossible to say. Darwin's famous calculation that 306,662,400 years is a "mere trifle" of geologic time is frequently regarded as a jest. But it means

that the orders of Crustaceans date back to those immeasurably remote periods preceding the Carboniferous system, and the ages have passed upon them without working even any striking accumulation of change. In the Protozoic periods, the earliest periods of life, we find the great classes of Mollusca—Gastropoda, the class that includes such creatures as limpets, whelks, snails, slugs : Cephalopoda, the class which includes the nautilus and the cuttlefish : Lamellibranchiata, the class which includes the oyster, cockle and mussel—and the ages likewise pass over them while evolutionary forces remain dormant. “The highest type of mollusc known to scientists,” says Townsend (“Collapse of Evolution,” p. 17), “is the one that appeared far back in geological history. The same may be said of the earliest fish, reptilian, and mammalian families ; they each appeared fully equipped at the outset in the plenitude of their power, and never since have shown the least elaboration or improvement.” At a sea depth of several miles Prof. Ritter found living creatures “essentially identical with those that lived in deep water in the Eocene ages, whose fossils are now in geological strata that during terrestrial upheavals were raised from sea depths millions of years ago.” In the Jurassic system, of the Mesozoic period, the middle period of life upon the Earth, we find the fossils of spiders, centipedes, cockroaches, grasshoppers, beetles, dragonflies, mayflies, and even the wing of a butterfly ; the nautilus and the cuttlefish persist, and survive right down to our time ; and ferns and conifers are found in abundance. The fossils of the Carboniferous system

include scorpions and beetles and crickets and mayflies. Of Gymnosperms, i.e. cone-bearing plants such as the pine and fir, larch and cedar, many species have perished, but the type continues unchanged from the Carboniferous system. The Carboniferous dates back unknown millions of years earlier than the Jurassic: the Silurian is equally unknown millions earlier than the Carboniferous: but the seaweeds of that far-off Silurian system are just as perfect as the seaweeds of the same kind found to-day.

How does all this come about if Evolution is a real law of life? The *permanence of types* stands out with immense emphasis from the geologic records. Perhaps it is also worth while to point out that in the long range of human history, go back as far as you will, plants and animals remain essentially the same. Our modern trees are just the same as far as ever we can trace them: they first become known to us just as they are to-day. And dogs and cats, oxen and weasels, crocodiles and ibises, mummified in ancient Egypt, perhaps as much as 4,000 years ago, are just the same as the animals we know to-day. Then we leap right back into the misty distances of the Jurassic—the middle period of Earth's life—and find the crocodile among the fossil reptiles which greet us there. Our human experience reveals to us fixity of species, and the same fixity of species stares at us from the geologic records. All this is entirely contrary to evolutionary conceptions.

(ii.) None the less, the Evolutionist declares that he can arrange fossils in series which show such

gradual and regular change as to be plainly genetic, i.e. a series actually descending the later from the earlier. The answer is quite a plain one. It is—that none of the "genetic series" shows any passage from *one type* into *another type*. The types are distinct, and there are no intermediate forms. Bateson somewhere scornfully says that many scientists are affirming that dogs, horses, cattle, sheep, poultry, etc., are each of them derived in their chief varieties from distinct forms—their reason being that, go as far back as they may, the distinctions between these chief varieties remain perfectly clear. So it seems to them, he says, "pleasanter to postpone the difficulty, relegating the critical differentiation to some misty antiquity into which we shall not be asked to penetrate" (Pres. Address to Brit. Assoc., p. 14). But when we come to consider the supposed "genetic series" of fossil forms, we do not find that anything is supplied to us which justifies any supposition that "misty antiquity" will justify the evolutionary idea. The series presents simply a number of fossils which it is possible to arrange so as to show slight differences as we pass along the line. There is absolutely no proof that there is any relationship of descent between them. Moreover, even if that essential were not missing, none of the series offers us a transmutation of types of being, which is the only true sense of "species" in this connection. Dr. H. F. Osborn, for example, says:—

"When Darwin published 'The Origin of Species' in 1859 no one had actually observed how one form of animal or plant passes into another, whether according to some

definite law or principle, or whether fortuitously or by chance. So far as we know, the honour of first observing how new specific forms arise belongs to W. H. Waagen ("Origin and Evolution of Life," pp. 138 ff.).

Dr. Osborn then goes on to give two plates picturing the "continuous character changes known as the Mutations of Waagen," dealing respectively with Ammonites Subradiatus and the Brachiopod, Spirifer Mucronatus—and in each case there is no passing in any sense whatever beyond the typal form! The kind of argument which is expected to pass muster is like that offered by Dr. Osborn as quoted above. "*We know*" that the one-toed horse had a four-toed ancestor, and that Man "*has descended from an ape-like form somewhere in the Tertiary*": followed at once by an admission of essential ignorance about it all: "*We do not know* their intervening causes, for none of the examples which have in turn been offered during the last hundred years satisfies the demands of observation, experiment, and reason: etc." (*ibid.*, Preface). All this means that not even Darwin had observed any transmutation of species, and that all the claims made since amount to no more than possibilities which have been unable to satisfy the claims of observation, experiment and reason.

The fixity of species which is so marked a feature of the geological record as compared with the life of to-day makes it necessary that there shall be a great deal more than a mere idea that likenesses of form between the individuals of a series *may* be explained by the Doctrine of Descent. One of the most sane and balanced examinations of the Doc-

trine of Descent is that by the late Duke of Argyle in his "Evolution Cross-Examined." He replies to the claim that the series of similar organic forms, showing slight variation from the one to the other, are truly genetic series derived the one from the other, whether it be a series of shells, or the famous series of Iguanadons in the Brussels Museum, or any other series, that—

"species have been quite as stable throughout the geological ages as they are at present. Linnæus' Binomial System of Classification is as applicable to, and fits as well into, the Trilobites of the Palæozoic rocks—the Brachypods and the Cephalopods of the Secondary Ages—the Mammalia of the Tertiary epoch, as it fits into all the species now alive or only recently extinct. Each species has its own distinctive characters, down to the minutest ornamentation on a scale or on an osseous scute, or to the peculiar varieties of pattern on the convolutions of an ammonite. These species continue till they die, and then they are often suddenly replaced by new forms and new patterns all as defined and as persistent as before. How this takes place no man as yet can tell." (p. 105.)

But it is quite clear that the "genetic series" reveal no transmutation of types.

(iii.) At the best the series of supposedly "derived forms" which the evolutionist shows us are very few and generally very far from complete. But his plea is that the geological record is imperfect, and we should see descent clearly if the record were full. In reply to this I quote a few words again from the Duke of Argyle (pp. 146 and 147). He puts in evidence that long quiet geologic period when without disturbance 1,300 ft. of Jurassic deposits were laid. In these deposits "no less than

1,850 new species have been counted, *all of them suddenly born*. . . . There is nothing more instructive than to place series of these new species, such as Ammonites, on a table side by side. The perfect regularity and beauty of each new pattern of shell, and the fixity of it so long as it existed at all, are features as striking as they are obvious."

In other words, where the geologic record is most perfect, there the failure of the evolutionary theory is most plain. Even were we to accept appearances in place of proof, and to allow that the various forms of Brachiopods or Trilobites have been derived the one from the other, yet nowhere is there even any appearance of one distinct type of organic life coming from or passing into any other distinct type of organic life. Where the record is clearest we perceive the new species suddenly born, persisting unchanged, and perhaps passing out of existence: but there are no intermediate forms, and one type does not pass into another.

(iv.) Moreover, the most critical test for the palæontologist comes when we reach more recent times. Intermediate forms have perished as ages have passed on—at least so we are asked to suppose. But that should be less true of more recent times. Surely when we come to times so recent that they witnessed the origin of our domestic animals, palæontology should abound with clear proof of the line of their descent. Yet here palæontology records one of its plain failures. "The origin of most of our domestic animals," says Darwin on page 21 of the "Origin," "will probably for ever remain vague." Or take again the supposed descent with

which Darwin especially struck the world's imagination, viz. the descent of Man from "a hairy tailed quadruped, probably arboreal in its habits, and an inhabitant of the Old World." Upon any theory of descent, Darwinian or any other (and let it always be clearly kept in mind that the Evolutionist is now claiming to regard Darwin's method of derivation as inadequate, but some other unknown method as certain and destined to be discovered in the time to come), what innumerable intermediate forms there must have been between this hairy tailed quadruped and Man ! The quadruped in question has itself never been found in the fossil deposits : it is entirely speculative. But in the long line of descent, through some creatures akin to the apes and then through others coming more and more fully to resemble Man, unknown millions of forms must have been included.¹ The persistent talk about "the Missing Link," in the singular number, is singular indeed. It indicates to us with what small supplies of evidence the human imagination prepares itself to be convinced. The theory is picturesque ; so, if it will only produce one thousandth part of the requisite evidence, the theory shall be accepted ! One "Missing Link"—and it shall be admitted that Man descended from a hairy tailed quadruped, probably arboreal in its habits ! But that one "Missing Link" all the strata obstinately refuse to produce. Of all the supposed millions of intermediate forms not one survives in the palaeontological records. The attempts which

¹ Darwin imagined not a pair but a tribe to have varied simultaneously.

have been made to produce a "missing link" are, indeed, pathetic in their eagerness and futility. The two supposedly intermediate forms upon which most emphasis is laid are the so-called "Pithecanthropus Erectus" and "Neanderthal Man" (*Homo Primigenius*). The latter consisted of the roof of a skull and some bones of the lower extremities, found in the Neanderthal, near Dusseldorf. Huxley gave his opinion that it was in no sense to be regarded as an intermediate form between Man and the ape; and it is simply preposterous to bring out these scanty remains as "the Missing Link" when Virchow said he had himself seen upon the street men with just such skulls, when Prof. Rudolph Wagner said it might be the skull of a modern Dutchman, and Prof. von Mayer that it might be the skull of a Cossack buried there in 1813 or 1814. Prof. Schwalbe christened the remains "*homo primigenius*," "the first-born Man," and no one should refuse the tribute due to his great courage.

"Pithecanthropus," or "the Ape-Man," a very question-begging title, is the name affixed to a real or imaginary animal, of whose anatomy the roof of a skull, two teeth, and a diseased thighbone, are supposed to form parts. The bones were found in a diluvial deposit near Trinil, Java, and hence are sometimes called the "Trinil skull," etc. The thighbone was found about fifty feet away from the rest of the remains, and quite probably did not belong to the same animal. Prof. Schwalbe, who gave the name "*homo primigenius*" to "Neanderthal Man," says in his Essay on "The Descent of Man" in "Darwin and Modern Science," that the

claim that *Pithecanthropus* is a transitional form has been much disputed, and that it has to be brought down to a later date than Dubois, the discoverer, imagined. He none the less advances it as furnishing "what Darwin missed most of all," viz. a missing link between the apes and Man. Dr. Erich Wassmann regards this course of procedure as "nothing short of an outrage upon Truth," and this would probably be the view of any jury of laymen who might chance to try the case. The evidence regarding these remains is given by T. H. Bishop in his most useful and careful little book "Evolution Criticized."¹ He shows that among other eminent men Prof. Virchow absolutely denied practically every contention of Dr. Dubois. He held that the remains, if all to be attributed to one animal, were the remains of an ape. It is worthy of note that so far as the Doctrine of Descent in relation to Man is concerned, Virchow denied not only descent from the monkey type but any racial variation in *Homo Sapiens*. "Types are fixed," and "as yet no diluvial discovery has been made which can be referred to a man of the pithecid type." (Quoted by Otto, "Naturalism and Religion," pp. 110 and 111.) It need hardly be said that Virchow was not an advocate of the Mosaic account of Creation, but merely a devotee of the proven fact. He regarded certain other remains as belonging, not to the transitional forms to which zealous Evolutionists were trying to allot them, but to diseased human

¹ (Pub.: Oliphants, Ltd.; not very methodical, but packed with information.)

beings, and as being not proofs of descent at all, but pathological ; and " a man modified by disease is still a man not a monkey." He declared moreover that the skull of Man and monkey are fundamentally different—in externals, crests, ridges, and shapes, and especially in the nature of the brain cavity. Virchow was anthropologist, ethnologist, osteologist, and in particular craniologist ; and his views upon skulls are thus of peculiar importance. These, and perhaps half a dozen other less famous so-called "transitional forms," are all that can be advanced ! ¹ In these more recent times, where

¹ Perhaps the most audacious and laughable of the attempts to label small parcels of bones with the "missing link" label is the effort of Prof. Eliot Smith in the "Illustrated London News" of June 24, 1922. Dr. H. F. Osborn had found in Nebraska an imperfect molar tooth. He declared that this tooth belonged to one of the missing links between Man and the Simian stock, and regarding the supposed owner of the imperfect molar tooth as a creature of the very evening of that "day" when the ape or pithecid type was changing into the human, he named the supposed owner "Hesperopithecus," the man of the ape-period evening. In "Nature," June, 1922, Dr. Smith Woodward, Keeper of Geology in the British Natural History Museum, gives his opinion that it was the tooth of a Pliocene bear ! But Prof. Eliot Smith of London University, believing Dr. Osborn to be right, succeeded in getting the Editor of the "Illustrated London News" to print an article upon this "ancestor" of the Human Race, and to have it illustrated by a great two-page picture, presenting to the innocent public of Great Britain pen-and-ink portraits, amid most realistic surroundings, not only of Hesperopithecus himself but also of Mrs. Hesperopithecus, his wife ! An admirable illustration of the audacity of evolutionary speculation ! Oliver Wendell Holmes has a

he is able to be tested, the palaeontologist can support the Doctrine of Descent with nothing better than these few, poor, doubtful, fragments out of the vast number of supposed transitional forms. He fails completely and obviously in the later times where he ought to be able to adduce ample evidence, and cannot therefore expect to carry much weight regarding those earlier times in which he claims that the evidence *would* be so conclusive if it had not perished !

Our impression that very slight weight indeed can be allowed to anything the palaeontologist is able to advance is further strengthened by the singular confidence displayed by the palaeontologist regarding the past which is only in such small measure open to our view, and the frank admission of the impossibility of being confident by the students of the living nature of to-day. In his Presidential Address to the British Association, 1914, Prof. Bateson, speaking of the need to attend to detail and to try to be sure of *something*, said : " It is no time to discuss the origin of the Mollusca or of Dicotyledons, while we are not even sure how it came to pass that *Primula Obconica* has in twenty-five years produced its abundant new forms almost under our eyes." (p. 11.) And again (p. 14), " When once the idea of a true-breeding—or, as we say, little poem entitled " The Height of the Ridiculous," which closes with the moral—

And now I never dare to be
As funny as I can.

That would be a wise maxim when the next imperfect molar tooth is found in Nebraska.

homogynous—type is grasped, the problem of variation becomes an insistent oppression. What can make such a type vary ? ” And he answers : Nothing but crossing. So Lotsy says, he continues : and “ after the blind complacency of conventional evolutionists it is refreshing to meet so frank an acknowledgment of the hardness of the problem.” “ Truth can only be chipped out in rare and isolated fragments.” The palæontologist’s confidence about things which seem to most other people to be very doubtful is strange ; and when we remember that he is confident about that which is mainly beyond our reach and even our sight, the word complacency does not appear to be too strong. He is confident where he cannot be tested, but fails absolutely where tests can be applied. He is confident about the unknown, when the student of living Nature is far from confident about the known : and the thought insists on passing through the mind that the palæontologist is in danger of dwelling so exclusively upon the ages past as to forget the findings of the living day. We cannot but conclude that the palæontological argument is without weight and has even less than nothing to contribute to the Doctrine of Descent.

B. In the second place stress is laid upon “ *rudimentary* ” or “ *vestigial* ” structures, which appear both in plants and animals. Such are the slight development of the muscle of the skin—panniculus carnosus : the muscles of the ear : the nictitating membrane in the human eye, the minute “ *third eyelid* ” : the vermiform appendage, or appendix, in the human intestine : mammae in the male

mammal (which Darwin regarded as undeveloped rather than vestigial): teeth which never cut through the gums in the upper jaw of unborn calves. Indeed "it would be impossible," Darwin declares, "to name one of the higher animals in which some part or other is not in a rudimentary condition." The argument is that they have been partially retained by the power of inheritance, though quite useless, and relate to a former state of things, when the structure properly developed was of use to the species from which the present owner of the useless structure was derived. But while the suggestion is almost romantically interesting, it is utterly inconclusive: and Huxley's verdict still stands—"a cautious reader will probably explain such cases deductively from the doctrine of evolution rather than endeavour to support the doctrine of Evolution by them. For it is almost impossible to prove that any structure, however rudimentary, is useless—that is, that it plays no part whatever in the economy; and if it is in the slightest degree useful there is no reason why, on the hypothesis of direct creation, it should not have been created. Nevertheless, double-edged as is the argument from rudimentary organs, there is probably none which has produced a greater effect in promoting the general acceptance of the theory of Evolution" ("Encyc. Brit."). In keeping with this it is significant that in the 1909 Commemoration Volume the subject of rudimentary or vestigial organs is not mentioned in the Index, and receives, I believe I may say, only three or four brief references in its pages. The vestigial-structure argument is quite

inconclusive. Indeed, it is another instance of argument in a circle. The theory of Evolution demands that rudimentary structures be vestigial, i.e. remnants from an earlier stage of development. So they are thus explained: and then in turn are themselves used to support the theory of Evolution. When we know more about these structures it may easily come to pass that because of their usefulness they harmonize with the doctrine of Special Creation.

C. The third argument is *embryological*, and has by many been considered the most powerful argument for the Doctrine of Descent. The evolutionary view is that "the ancestral history is repeated in a condensed form in the embryological, and that a study of the latter enables us to form a picture of the stages of structure through which the organism has passed in its evolution. It enables us on this view to reconstruct the pedigree of animals, and so to form a genealogical tree which shall be a true expression of their natural relations." (Prof. Sedgwick, Prof. of Zoology and Comparative Anatomy at Cambridge, "Darwin and Modern Science," p. 174.)

The value of this argument depends entirely upon the real similarity, identity would be the true word, between the embryos of species related to one another by descent from a common ancestor, in the earlier stages of embryonic existence. "If we take the higher vertebrates, viz. reptiles, birds, and mammals, there is an undeniable resemblance between their embryonic stages. They seem, as it were, to travel a considerable distance along the

same road, or along closely parallel roads, before they diverge, each on its own path of development" ("Evolution," pp. 49 and 50). Prof. Marshall put the matter epigrammatically when he said that the individual climbs up his own genealogical tree. The human embryo, through a large part of its growth, is so much like the embryos of the other vertebrates that the conclusion is urged that Man has a long vertebrate ancestry of lower forms of life: and the embryos of other vertebrates tell, of course, a similar tale concerning these in their turn.

But this *supposition* respecting embryos which present likenesses is only a supposition. In the progressive changes which occur during the life of the embryos of Man or animals there is nothing to substantiate the supposition. The embryos of each in all stages of their embryonic life are true to their own specific type. The progressively developing embryo of Man or horse or chick, is always Man-Embryo, horse-embryo, or chick-embryo. This is clear from the *outcome*. However alike the embryos may be, they are at birth revealed as Man-Child, colt, and chick, and never anything else. Our sight is not sufficiently acute perchance to realize the differences. But they are there: and Geology does not help the Evolutionist by presenting the remains of any of those unknown billions of intermediate forms, connecting the embryos, which would be found in some measure if the embryological argument had any force.

This theory is generally termed the Recapitulation Theory, because the stages of the embryo recapitulate the history of the organism. The

question is worth asking: Does the doctrine of Evolution support the Recapitulation Theory, or does the Recapitulation Theory support the doctrine of Evolution? The answer seems to be quite clear. *Evolutionists take each of them in turn as the ground-work of the other.* The argument makes a very perfect circle. Recapitulation is a deduction from the theory of Evolution: and, having been deduced, it is then used as a main support of that theory.

Prof. Sedgwick's estimate of the value of this embryological argument is very adverse, and it is necessary even at some length to note what he says:—

"In the first place, it must be noted that the Recapitulation Theory is itself a deduction from the theory of Evolution. The facts of embryology, particularly of vertebrate embryology, and of larval history, receive, it is argued, an explanation on the view that the successive stages of development are on the whole records of adult stages of structure, which the species has passed through in its evolution. . . . If it could be shown, as was stated to be the case by L. Agassiz, that ancient and extinct forms of life present features of structure now only found in embryos, we should have a body of facts of the greatest importance in the present discussion. But as Huxley has shown ('Scientific Memoirs,' 1898, Vol. I, p. 303, 'There is no real parallel between the successive forms assumed in the development of the life of the individual at present, and those which have appeared at different epochs in the past'), and as the whole course of palæontological and embryological investigation has demonstrated, no such statement can be made. The extinct forms of life are very similar to those now existing and there is nothing specially embryonic about them. So that the facts, as we know them, lend no support to the theory.

"But there is another class of facts which have been

alleged in favour of the theory, viz. the facts which have been included in the generalization known as the Law of v. Baer. The Law asserts that embryos of different species of animals of the same group are more alike than the adults, and that the younger the embryo the greater the resemblances. If this Law could be established it would undoubtedly be a strong argument in favour of the 'Recapitulation' explanation of the facts of embryology. But its truth has been seriously disputed. If it were true we should expect to find that the embryos of closely similar species would be indistinguishable from one another, but this is notoriously not the case. . . .

"It is useless to say, as Weissmann has stated, that 'it cannot be disputed that the vestiges of gill-arches and gill-clefts, which are peculiar to one stage of human ontogeny, give us every ground for concluding that we possessed fish-like ancestors.' The question at issue is, Did the pharyngeal arches and clefts of mammalian embryos ever discharge a branchial function in an adult ancestor of the mammalia? We cannot therefore, without begging the question at issue in the grossest manner, apply to them the terms 'gill-arches' and 'gill-clefts.' That they are homologous with the gill-arches and gill-clefts of fishes is true: but there is no evidence to show that they ever discharged a branchial function (i.e. a function pertaining to the gills). Until such evidence is forthcoming it is beside the point to say it 'cannot be disputed' that they are evidence of a piscine ancestry.

"It must therefore be admitted that one outcome of the progress of embryological and palaeontological research for the last fifty years is negative. The Recapitulation Theory originated as a deduction from the Evolution Theory, and as a deduction it still remains."

And Prof. Sedgwick closes his Essay ("Darwin and Modern Science," pp. 174, 5 and 6, and 184) in terms which recall the outlook of Prof. Hoffding, of Profs. Geddes and Thomson, and of Prof. Seward, in other evolutionary connections: "Dar-

win was the last man who would have claimed finality for any of his doctrines, but he might fairly have claimed to have set going a process of intellectual fermentation which is still very far from completion." Darwin has given zest to embryological research.

D. The embryonic argument is thus most inadmissible, and in Prof. Sedgwick's judgment is negatived by the research of the past fifty years. Moreover, it is itself a deduction from the theory of Evolution and is then advanced as perhaps the main pillar of the theory of Evolution itself. As one reads the "embryological argument" the completeness of the circle induces an intellectual giddiness, not greatly mitigated by the evolutionary contention that there is no other possible explanation of the facts of embryology. Is there not, then, any other explanation of the likeness between embryos? No explanation, for instance, consonant with the creational view which Evolution has done so much to undermine? Undoubtedly there is: but it may perhaps best be stated after a brief consideration of the next line of argument for Evolution as the Doctrine of Descent—viz. *the anatomical argument*. Let us proceed then first to consider this last-named line of argument. It is a singular fact, and undoubtedly one which speaks eloquently of a change of view, that while Darwin gave a section to Morphology in his "Origin," while Huxley gave it prominence in his article in the 9th Edition of the "Encyclopædia Britannica," and while Prof. Chalmers Mitchell deals with the question of Anatomy in the 10th Edition of the same, there is yet no

reference either to Anatomy, or to Morphology, or to Homologies, in the whole Index of the Memorial Volume, "Darwin and Modern Science," 1909. The argument from Anatomy or Morphology is based upon "the recognition of homologies, i.e. of deeply-rooted structural and developmental similarities. . . . When two or more structures, organs, or specialized parts, in one and the same organism, or in several organisms, show a deep resemblance in their architecture and also in their manner of development, they are said to be homologous" ("Evolution," p. 42). Functional resemblances are *analogies*: structural resemblances are *homologies*. Owen's classic statement gives three instances in illustration of homology and analogy: the wing of a bird and the arm of a man, both forelimbs, with fundamentally the same structure as regards bones and muscles, nerves and blood-vessels—these are homologous and not analogous; the wing of bird and butterfly, akin in function but not in structure—these are analogous but not homologous; the wing of bird and bat, akin both in structure and in function—these are both analogous and homologous. "If we take a series of forelimbs among back-boned animals—the arm of a frog, the paddle of a turtle, the wing of a bird, the foreleg of a horse, the flapper of a whale, the wing of a bat, and the arm of Man—we find detailed homology, not only as regards the bones but as regards muscles, nerves, and bloodvessels" ("Evolution," p. 44). It is claimed that the evolutionary suggestiveness of this is indisputable, and that it is difficult to suggest any explanation except blood

relationship. "As Darwin said, How inexplicable is the similar pattern of the hand of a man, the foot of a dog, the wing of a bat, the flapper of a seal, on the doctrine of independent acts of creation! How simply explained on the principle of the Natural Selection of successive slight variations in the diverging descendants from a single progenitor!"

Let anyone immerse himself in the vast welter of scientific theory and discussion to-day regarding the Doctrine of Descent, and he will find himself smiling a broad smile at Darwin's enthusiastic exclamation, "How simply explained!" It is comparable only with the superb confidence regarding those transitional forms which palæontology has *not* revealed, "These breaks depend merely on the number of related forms which have become extinct." "*Merely*!" Who would imagine that in those more recent times when "breaks" should be few if the Doctrine of Descent is a sound doctrine, e.g. in such cases as those of Man and the domestic animals, it is nothing but "breaks" and the transitional forms are not to be found? So in this case the simplicity has not been very apparent as the years have passed on. The homologies as structural similarities are not disputed, but that they prove descent has been disputed strongly, as for example Mr. T. B. Bishop shows in his "Evolution Criticized." Prof. St. George Mivart pointed out that very great caution is needed in endeavouring to discriminate between likenesses which may be due to inheritance and those which are due to some other cause. Dr. Rudolf Otto, Professor of Theology at Göttingen, has explained in his "Naturalism and

Religion" the view of this matter taken by some German naturalists. "One of the best known of the earlier examples of this (i.e. hostile) mood is Kerner von Marilann's large and beautiful work on 'Plant Life.' Kerner only admits that our present species have arisen by 'crossing of similar but relatively different forms,' these variations altering the configuration and appearance in detail, but neither affecting the general character nor causing any transition from lower to higher." He disposes of the chief argument in favour of descent, namely the one we are now considering, i.e. the homology of individual organs, by explaining that the homology is due to similarity of function in the different organisms. All Darwin's four illustrations quoted above are within the vertebrate tribe or "phylum," and Otto quotes Prof. Fleishmann, Professor of Zoology at Erlangen: "Within the vertebrate phylum, with its fishes, amphibians, reptiles, birds and mammals, it is also true that 'No bridge leads from one to the other.'" And again: "Recapitulation does not occur." Then of Prof. Hamann, Otto says: "Hamann's main theme is that Darwinism overlooks the fact that there cannot have been an origin of higher types from types already finished. It is impossible to derive Metazoa from Protozoa in their present finished state of Evolution. . . . It is only by a stretch of fancy that fishes can be derived from worms, or higher vertebrates from fishes. One of his favourite arguments—and it is a weighty one, though neglected by the orthodox Darwinians—is that living substance is capable, under similar stimuli, of developing spon-

taneously and afresh, at quite different points and in different groups, similar organs. . . . Therefore homology of organs is no proof of their hereditary affiliation" (Otto, pp. 112 to 123). In 1916 Prof. D'Arcy W. Thompson issued a volume "On Growth and Form," and maintained that "in many cases details of animal structure are the inevitable outcome of simple natural forces. They are what they are because, given the nature of the material and the limiting conditions of growth, they could not be otherwise. Resemblances are the result of similar forces playing on similar material. . . . The Zoologist must begin with mathematics. It is only when he has satisfied himself that a form or magnitude, an arrest or a proliferation, is not the immediate consequence of simple and known factors that he is entitled to suggest purpose or design, blood-relationship or its absence." If these views be true, the whole argument from homology may, indeed must, be set aside: and, in reading the very confident statements of the exponents of the Doctrine of Descent, the true substance of the argument must not be lost to sight. It is very easy to miss the fact that the whole anatomical argument, and indeed the whole substance of the Doctrine of Descent, as regards for example the relationship between Man and the ape, IS NOTHING MORE THAN A SUMMARIZED REPRESENTATION OF WHAT IS KNOWN IN REGARD TO THE DEGREE OF RESEMBLANCE BETWEEN THE DIFFERENT FORMS. This is the frank admission of Prof. Schwalbe, Professor of Anatomy at Strasburg University, whose views regarding Neanderthal Man have been

given above. In other words, this determined upholder of Man's simian ancestry admits that there is no knowledge of the descent, but only a likeness of structure which descent might perhaps explain. It is an explanation, therefore, with no proof behind it, and it is obliged to give place to any explanation which is accompanied by proof.

Thus the usual differences have developed between the Darwinian and the later interpretation of natural facts, and so unsubstantial does this main pillar of the Doctrine of Descent turn out to be. The very least that must be said concerning the evolutionary argument from homologies is that there is the gravest doubt as to the reality of the argument. It is an argument from likenesses, unwarrantably assumed to be only explainable in one way. There has always been one other explanation ; and further explanations, as we have seen, are forthcoming with the years. In the Creational Doctrine, which Darwin and the Evolutionists cast aside, there always has been and still is a very simple and satisfactory explanation. The Platonic "Archetypes" are stated to have helped to make the idea of homology clear, and they certainly suggest with great force the inevitable creational aspect of homologies. Is not the probability overwhelming that if God did create the world and all things therein all the homologies would be to-day just what they actually are ? *Is not the probability overwhelming that in creating the organic world, just as in creating the inorganic, certain fixed typal forms would be used for its construction ? Would not certain architectural forms be*

carried through certain orders of existence? And is not that exactly what strikes us in the homologies in question? There is simply no doubt that, as investigation proceeds, we are being steadily driven back to teleological and creational theories. Mutation has ousted Darwinian Variation; and Darwin himself could see little difference between Mutation and Creation. The realization that heritable Variation is confined to Variation that arises from the germ-plasm of the organism is forcing a teleological view upon the world. Huxley's words ("Encyc. Brit.," Ed. IX.) stand out as almost prophetic: "It is quite conceivable that every species tends to produce Varieties of a limited number and kind, and that the effect of Natural Selection is to favour the development of some of these while it opposes the development of others along *their predetermined lines* of modification." So likewise in an address at the Darwin Anniversary, 1909, before the Royal Institution in London, Alfred Russel Wallace said, referring to Haeckel:—

"These unavailing efforts seem to lead us to the irresistible conclusion that, beyond and above all terrestrial agencies, there is some great source of energy and guidance, which in unknown ways pervades every form of organized life, and of which we ourselves are the ultimate and fore-ordained outcome."

"*Their predetermined lines of modification!*" "*The ultimate and fore-ordained outcome!*" The world of thought is perforce falling back upon teleological conceptions. Its eyes are already lifted toward the hills. Up in the heights, there, is the

Creational Theory ; and to Creationism homologies present no difficulty. Indeed, it expects to find them. It would be amazing indeed if the Creation had no great lines of architectural design.

So likewise does the Creational Doctrine offer a simple explanation of embryological similarities. Those orders of being which were created homologous in their structure must needs also be alike in their embryological development. During the months in which the human embryo develops from the ovum and passes through its necessary changes, how can it fail to be like other creatures whose architectural plan is in so many respects similar ? It is just the “superfluity of naughtiness” to thrust herein the “Recapitulation Theory”—first deducing it from the Doctrine of Descent and then using it as one of the main supports of that self-same doctrine. That the human embryo is not in reality *the same as*, but only looks like, the embryo of the fish, the snake, or the pig is clear from the simple fact that the human embryo never becomes anything but a human being, and the embryo of a pig never becomes anything but a pig. It is very easy for the thoughtless to be misled by embryological likenesses, but the inevitability of such likenesses is surely not very far to seek. Upon the Creational Doctrine the likeness is inevitable between the embryos of creatures which share the same general architectural design. Were there no such likeness we should be confronted with an insoluble problem. Likenesses in the late stages cannot but be paralleled by likenesses in the early ones.

E. With a clear realization of the entirely incon-

clusive character of the first four lines of argument for the Doctrine of Descent, we come to the final argument, viz. *the facts of Classification*, and the difficulty as to the bounds of species because of intermediate forms. It is this very difficulty which suggests what is perhaps the solution of the whole vexed problem of movement in the organic world.

I have above quoted (p. 40) the admirable words in which Profs. Geddes and Thomson state this argument: and the facts as they state them are not in their substance disputed so far as I am aware. The argument is that it is impossible not to feel in biological classification the suggestion of pedigrees and heraldry.

What is a Species? It is difficult to say. Darwin has a long glossary of terms in his "Origin," but "species" is not one of the terms defined. It has been defined as "a collection of individual plants or animals which resemble each other so closely that they can reasonably be supposed to have descended from a common ancestor." It is also defined as "a group of animals or plants subordinate to a genus, having members that differ among themselves only in minor detail of proportion and colour, and capable of fertile interbreeding indefinitely." The lack of precision is inevitable. Members of a Species may differ among themselves, and it is most difficult to determine what is a minor detail of proportion or colour. Prof. Macbride, in his "Zoology," defines a species as including "all animals, indistinguishable from one another by any constant mark (apart from the differences due to age and sex), which conjugate freely with one another and

produce fertile offspring" (pp. 81 and 82, ed. 1922). With the main point of this Prof. Bateson agrees. In his Presidential Address to the British Association he protests against the artificiality of present classification. Without the tests of experimental breeding we are "merely guessing" when we say that this is a Species and that a Variety. The palæontologist, we may remark, is therefore of necessity guessing all the time: he cannot test the breeding power of his genetic series. "The only unit in classification is the homozygous form which breeds true. When we presume to say that such and such differences are trivial and such others valid, we are commonly embarking on a course for which there is no physiological warrant." With the ordinary classifications, and all their intermediate forms, the student of Variation, says Bateson, has nothing to do. The "little Species," tried out, proves to be fixed, and the intermediate forms are mongrels produced by crossing. What would Classification be like if ordered on Bateson's principles? It is not at all likely there would be the "over a million" species to which Geddes and Thomson make reference. With Linnæus also a Species is a *Group*—for example, the Human Race, *Homo Sapiens*: whereas Darwin once gave the oft-quoted definition, "Varieties are incipient Species," and in his "Life and Letters" he says: "Varieties are only *small species*" (the italics are mine). What a change it would have made if Darwin had called his famous volume "The Origin of Varieties"! That word, Varieties, has a fairly fixed and limited meaning: but who shall say what a Species really is? and

what were the limits of Evolution involved in the title "The Origin of *Species*"?

As every one knows the Evolutionist did not admit any limits at all. "Species" in Darwin's title seems to mean nothing less than "organic life." If he admitted ignorance about the initial step, and the appearance of the earliest form of life, from that stage on Darwinism seems to mean the origin of everything. Yet the student of Darwin soon finds himself in a state of perplexity as to what Darwin conceived to be the limits of Evolution. His famous work is called "The Origin of *Species*," and in Chapter 12, page 503, he says: "The question of single or multiple centres of creation differs from another though allied question —viz. whether all the individuals of *the same species* are descended from a single pair. . . ." (the italics are mine). Or again, on page 561 he says: "The difficulty is not insuperable in believing that all the individuals of *the same species*, wherever found, are descended from common parents." But in the same chapter he greatly extends the claim: "If the difficulties be not insuperable in admitting that in the long course of time all the individuals of *the same species*, and likewise of *the several species belonging to the same genus*, have proceeded from some one source, then, etc." And in his "Variation of Animals and Plants" the claim is extended to Orders and even Classes. This expansion of the range of Evolution seems quite too facile to be consistent with the character of Darwin's work: but the explanation may be that Darwin realized the immense difficulty of classification, and inasmuch

as he believed "community of descent is the bond" to be sought (p. 569), regarded the limits of species, genera, families, orders, classes, as being in reality quite indeterminate.

The universally admitted fact, at any rate, is that Classification is a matter of immense difficulty : and therefore *any argument based on Classification must needs be looked at very critically and regarded as of very meagre value.* When the problem of Classification has been settled it may well be found that the limits of the then established Species are quite clear. Darwin claims that all the individuals of the same genus, and even of the same Order and Class, are descended from a common ancestor. Why, then, did he not entitle his great work "The Origin of Genera" ? The answer, after reviewing the measure in which transmutation has been proved, seems naturally to be that Genera are far more distinctly delineated than Species, that Species may easily be confused with Varieties, and that no instance is known in which a clear type or genus has been transmuted into another clear type or genus. Greatly daring, one may perhaps venture to surmise that the alternative titles were "The Origin of Genera," "The Origin of Species," and "The Origin of Varieties"—of which the first too far overleapt the facts, the third made too meagre a claim to satisfy a soaring mind, and the choice was thus shut up to the second title with its essentially elastic term. What precisely *is* a Species ? Echo answers, What ? But Darwin had no answer, and Bateson wants an entirely new classification, to replace the present, which is far too largely "merely

guessing." Certain it is that until Classification has reached a far more perfect state than it has reached at present the argument that Species melts into Species will not weigh heavily in favour of the Doctrine of Descent. There is no part of an organism which is not liable to Variation: and thus, as each distinct type of organic life may be varying in practically all directions, each type approaches its neighbours on all sides, *while crossings greatly complicate the situation*, and to our dull vision the lines of demarcation become blurred. The whole argument partakes of a looseness and slipshodness which ill assorts with the exactitude of the scientific ideal. We may, indeed we must, first ask to know what is really meant by a Species, before we can be expected to find the very least measure of conviction in the argument from Classification.

Thus the five main arguments—palæontological, vestigial, embryological, homological, and classificatory—have not sufficient likelihood individually to give them even cumulative effect.¹ Each of them

¹ The article "Evolution," in "Chambers' Encyclopædia," admits the failure not merely of Darwinism but of the whole Evolutionary conception. The likelihood of Darwinian Evolution, it says, seems great when we find rudimentary organs sometimes present, sometimes absent (intellectual necessity of conformity to Archetypal forms being thus barred out): or when we note the extreme difficulty of arranging specimens in *specific* rank: or when we accept the present nebular formation of new worlds. Yet likelihood is not proof, and failure at essential points discredits the theory. But further than this, "the psychologist admits the same inability to derive psychological processes and states from the nutritive and reproductive

is in fact improbable: and five improbabilities do not in their sum amount to one probability. In two cases the argument is simply a circle, in two cases it is quite inconclusive and hardly touches the matter at issue, and in the one case remaining there are more *cons.* than *pros.* The Doctrine of Descent stands out at last certainly an unproven and probably a disproven theory. Especially upon one outstanding fact, like a rock in the seas upon which the vessel is wrecked and broken, the Doctrine of Descent is wrecked: viz. that neither Palæontology, nor scientific research into the organic world of to-day, is able to supply one single instance where one Species—*which in all evolutionary argument is treated as a distinct type of organic being*—has been transmuted into another Species. Amid all the movement of the Earth, that movement, “flux,” “becoming,” which has been the primary cause of the evolutional theorizing of 2,000 years and more of European life, distinct types remain distinct, however much *within themselves* they vary. A fern remains a fern, a poppy remains a poppy, celandine remains celandine, *Oenothera Lamarckiana* remains *Oenothera* still after all Variation is established. So likewise in the animal world the typal bounding lines are never crossed. On this rock the Doctrine of Descent is stranded, and the waves of thought have now broken it beyond repair. It is a startling and even tragic thing that Europe, the intellectual centre of modern humanity, has, functions and structures which form the subject-matter of biology, that the biologist does to derive these from inorganic processes.”

for 2,500 years, thought and theorized about Evolution—and Evolution still remains merely a theory and a fascinating dream.

Huxley once made a famous jest at the expense of Herbert Spencer. He said that Spencer's idea of a tragedy was that a brilliant theory should be killed by a wicked fact. It is in reality almost too tragic a thing for jest, and yet the parallel is clear. The theory of Evolution has fascinated some of the best minds of two and a half millenniums. The two and a half millenniums have closed with an outburst of enthusiastic research, inspired by a mighty hope of attainment—an outburst and a hope to which there is probably no parallel in all the history of mankind. As the research culminates the hope of attainment dies. It is the great tragedy of human endeavour in the realm of Thought. The fascinating theory founders upon this sharp ridge of fact—that there is no evidence of transmutation. Not a single instance is able to be adduced; and the more the presumptions and presuppositions of the theory are examined, the more improbable and even impossible do they appear to be. The advocates of the theory unconsciously admit its bankruptcy. What more despairing words, for instance, were ever penned than those in which Profs. Geddes and Thomson, enthusiastic and full-blooded evolutionists, appeal from hostile fact to friendly poetic fancy? Amid all the tremendous outburst of scientific research which it was Darwin's grand achievement to elicit, these enthusiastic evolutionists seem to realize that in spite of all their pleading and insistence, Nature

refuses them the necessary FACTS: and therefore, still clinging to the evolutionary dream, they acclaim "Wordsworth, Emerson, Meredith, these and many other Nature Poets," as "perhaps the truest, because deepest, biologists of us all." How are the mighty fallen, and the weapons of war perished! The men of war are gone and there is no one to appeal to but the minstrels. It is an admission, and quite plainly an unconscious admission, that the fight is lost. But though the vast achievement once credited to him is now known to be not real but only visionary, the name of Darwin will ever recall the most romantic passage in the history of the Mind, and the Doctrine of Descent will stand out as Mankind's most fascinating dream.

CHAPTER X

EVOLUTION WITHIN RIGID LIMITS: THE ONE, STRICTLY LIMITED, PROVEN SPHERE OF EVOLUTION

THUS Darwinism, as the *method* of the Descent of Species, is rejected by the Men of Science of to-day: and the Doctrine of Descent, by some unknown method or methods deriving the forms of organic life from one, or from some few, original forms, lacks all substantiation and has not established the very slightest claim upon the credence of mankind. Is there then nothing at all that remains? nothing, that is, except the knowledge of our ignorance of origins? Or if there is something yet remaining, is it of importance enough to warrant attention? The answer is that something certainly does still remain to us: a process to which we cannot refuse the name of Evolution is a fact, although a fact of *very limited* scope: and inasmuch as it *is* a fact, it is on that account alone worthy of the closest attention. It was the vastness of the claim of Evolution which beyond all doubt lent it its fascination, and it is that also which has caused its slowly recognized failure. A very limited Evolution may fascinate no more, but as matter of fact there is a very limited sphere in which Evolution is established and in which the Darwinian

theory of Natural Selection may hold a place. "Natural Selection is a *vera causa* as far as it goes" is a claim which may be true: but in that case *its proven sphere is confined within the bounds of the distinct type or Species*. It is thoroughly worthy of establishment both that there is such a movement as is indicated, that possibly it proceeds by the method of Natural Selection as one of its methods, and that its sphere of activity is severely limited. If the modern outburst of research and thought has brought to an end at length the vast unwarrantable evolutionary dream, it has abundantly justified itself.

The "Evolution" I refer to is evolution on a very small scale, acting only within the "Species": and if I might coin a word by combining Latin *parva*, "small" with the other Latin word "*Evolutio*," I would gladly distinguish this from the old ambitious and discredited Evolution by naming it Parvolution, or by a combination of the word "Varieties" with "Evolution" denominate it "Varvolution."

The title of Darwin's great work was, when strictly interpreted, a somewhat modest one—"The Origin of *Species*": and it seems clear that Darwin himself, though he allowed his scientific imagination wide range, hesitated to go so far as many of his followers have gone. The Evolutionist has claimed vastly too much. The exuberance of his claims has been almost infinite, and it is this exuberance which has aroused the intense antagonism between Religion and Science which was thus inevitable and has wrought such harm. Darwin did not assert that

the widely different types of life have come from a common ancestor. Even when he hesitates in the "Origin" as to whether certain Varieties are to be called Species, deciding upon the latter name, and then allows himself to refer to genera also: and when he goes on in his "Variation of Animals and Plants" to include Orders and Classes in his evolutionary scheme—even then, all he claims is that "all the members of the same Order or Class are descended from a common ancestor." He never declared, for instance, that Vertebrates, Mollusca, and Arthropoda are descended from a common ancestor. Far as he went, he left it to others to stretch a tenuous theory as far and even farther than this. Darwin himself inclined to the belief that life appeared upon the Earth in several different forms, and that their descendants remain distinct to-day. He did not trace everything alike back to some life-form which arose amid what Martineau so aptly termed "the fucous slime of waste sea-shores." It is well that Bateson should chastise this exuberance of the Evolutionists and say that the suggestion of the spontaneous formation of formaldehyde as the first step in the origin of life reminded him of Harry Lauder, in the character of a Glasgow schoolboy, pulling his treasures out of his pocket and saying: "That's a washer—for making motor-cars!" The thoroughly theoretical character which still adheres to evolutionary propositions is well illustrated in the language of Evolutionists. Prof. Macbride, for instance ("Zoology," pp. 88 and 89, 1922), only says what a Species "*will do*," and how all the vast complexity

of Classes, Orders, Tribes, Genera, Species, within the limits of the Phylum "*will* come about." What a Species *has* done is not indicated. Indeed, the extraordinary licence, not to call it looseness, which some exponents of Darwinism allow themselves, is shown by such a statement as that of Prof. Macbride, that "the sole question at issue" between the Darwinian and those who reject his theory is whether "the tremendous slaughter among wild animals" "suberves the welfare of the Species or not"! Yet in the same chapter he goes on himself to say that Darwin's assumption of the heritability of differences between members of the same litter or family is unsupported by fact and hence that continued selection of individuals showing slight differences from their brethren is not true. Moreover, he says that Lamarck's theory, "though not popular with the majority of naturalists at the present time," seems to offer by far the most hopeful solution of the origin of Variation. Most assuredly these also are differences between Darwinians and those who reject his theory. Or again, Prof. Macbride in this same "People's Book" on Zoology says that the only instance of a natural species giving rise to a new "elementary species," i.e. a Mutational Variety, breeding true, which De Vries has been able to discover is "the case of an evening primrose." A very slight acquaintance with De Vries' volumes will show this statement to be quite incorrect. How vastly different from this carelessness of statement and from these exuberant claims are the words of A. R. Wallace, who speaks with such great prestige. His

contention in comparison with others shows the greatest restraint. "Every fresh discovery in Nature," he said, "fortifies that original hypothesis. But this is the sane and honest Evolution, which does not concern itself at all with beginnings, *and merely follows a few links in a fairly obvious chain*. As to the chain itself, Evolution has nothing to say. For my own part I am convinced that at one period in the Earth's history there was a definite act of Creation, that from that moment Evolution has been at work, and guidance has been exercised" ("New Thoughts on Evolution," pp. 13 and 14). Prof. Hoffding's words are most true, that Darwin's followers sometimes grew dizzy, and in so far as Darwin also soared to some heights which were purely speculative, we can hardly deny that there was a trace of that dizziness in the Master himself.

The real proven sphere of Evolution is simply *within the type*. If that type be called a "Species," then Evolution rightly says that Variations occur in great numbers within the Species, and that some are perpetuated, being selected in some manner or manners, one method of selection being quite possibly what Darwin called Natural Selection.

It cannot be admitted that Darwin's derivation of all present forms from a few original and unexplained typal forms has any evidence to substantiate it. From each of those original forms Darwin would derive many Orders, Genera and Species which are perfectly distinct to-day. There is no proof whatever of such derivation of present-day Species. No single instance is known where one form has been transmuted into another by Natural

Selection or by any other means. The words of Prof. Bateson, in his Presidential Address when President of the British Association, are very conclusive on this matter:—

“Formerly single origins were generally presumed, but at the present time numbers of the chief products of domestication—dogs, horses, cattle, sheep, poultry, wheat, rice, oats, plums, cherries—have in turn been accepted as ‘polyphyletic,’ or in other words derived from several distinct forms. The reason that has led to these judgments is that the distinctions between the chief Varieties can be traced as far back as the evidence reaches, and that these distinctions are so great, so far transcending what we actually know Variation capable of effecting, that it seems pleasanter to postpone the difficulty, relegating the critical differentiation to some misty antiquity into which we shall not be asked to penetrate. For it need hardly be said that this is mere procrastination. If the origin of a form under domestication is hard to imagine, it becomes no easier to conceive of such enormous deviation from type coming to pass in a wild state. Examine any two thoroughly distinct Species which meet each other in their distribution, as, for example, *Lychnis Diurna* and *Vespertina* do. In areas of overlap are many intermediate forms. These used to be taken as transitional steps, and the Specific distinctness of *Diurna* and *Vespertina* was on that account questioned. Once it is known that these supposed intergrades are merely mongrels between the two Species, the transition from one to the other is practically beyond the power of our imagination to conceive. . . . I take this to show how entirely the facts were formerly misrepresented” (p. 14).

Thus, it being quite impossible not indeed to prove, but even merely to conceive, how even Varieties became distinct the one from the other, the effort to conceive the process is abandoned, and

the process relegated to some misty antiquity to which we shall not be asked to penetrate! It is much more certain that no change from one *type* to another has ever been known, or can even be conceived. Therefore it is the Evolutionist appears before the public like an Homeric God, enveloped in a mist—of antiquity.

Evolution within the type is all that can be legitimately posited, and that Evolution amounts to no more than the stabilizing of certain Variations. *That there has not only been Variation within the type, but that there has been a great deal of it, there can be no question—nor is the most convinced Creationist concerned to deny it.* Such a statement as Mr. Philip Mauro's—that apart from the human race, the organic world is static—is far removed from the facts. A more accurate classification will probably assign many so-called Species to the category of Varieties within the Type. "Evolution within the type," says Prof. W. B. Scott, in his "Theory of Evolution," " might be admitted without conceding the possibility of deriving one type from another." So Prof. Hoffding says: "It has also been shown by the experimental method, which in recent biological work has succeeded Darwin's more historical method, that types once constituted possess great permanence, the fluctuation being restricted within clearly defined boundaries" ("Darwin and Modern Science," pp. 447 and 448). Mendelism, which some Evolutionists are quoting as though it supported the variability of types and the Doctrine of Descent, in reality reveals not the variability but the rigidity of specific types. The word "Species" to-day must

have a strict and concrete meaning, in distinction from the word "Variety": and while Species remain fixed, Varieties appear in great number and a large proportion of them by crossing. De Vries declares:—

"The constancy of Species is a demonstrated fact: their transmutability is still a matter of theory." Then he goes on at once (p. 205, "The Mutation Theory"): "This is the old objection against the theory of descent. Lamarck, Darwin and Wallace met this difficulty by assuming that the immutability was only apparent and was due to the fact that the changes are so slow that in the short time during which we are able to observe them they cannot be detected. This, however, is a mere assumption, as I have already shown."

Certainly it is only Varieties whose evolution has been proved; though it must be borne in mind that it is quite conceivable that a true classification will reveal a very limited number of original untransmutable typal forms, call them what we may, within which typal forms many varieties have arisen. Evolution within the type, or Parvolution as I have ventured to call it, may thus be a very considerable thing.

That many striking Varieties have arisen it is simply foolish to question; and perhaps the real character and achievement of that "flux of things," which Evolution seeks to interpret, is nowhere better illustrated than by the Human Species, from a consideration of which Species modern evolutionary theory took its rise. It is worthy of a great deal of emphasis that it was from the study of social theory that the conception of Natural Selection had its

beginning. Malthus' *Essay on Population* gave to Darwin, and also to Wallace, and also "came within an ace" of giving to Spencer, the vision how everywhere, in the struggle for existence which the scarcity of sustenance everywhere involves, those who possess any superiority win and live while the inferior lose and die. Darwin read Malthus in 1838 and gained from it the idea which for twenty years he resolutely developed until in 1859 he published his "Origin." In 1858, while ill with fever at Ternate, Alfred Russel Wallace found himself recapitulating in his thought the argument of Malthus' book, which he had read twelve years before. As soon as fever permitted he rose and wrote hastily a Paper embodying the same idea of Natural Selection at which Darwin had been working for twenty years. Thus it was a process which Malthus adumbrated, and Darwin and Wallace clearly perceived and seized, *a process proceeding in the realm of human affairs*, which revealed the secret of Natural Selection.

But not only so. There seems little doubt that the *faith* in Evolution was fostered, not perhaps consciously but none the less deeply and truly, through the social transformations of the age. The eye sees only what it brings with it, the power of seeing: and the reason why Darwin, Wallace and Spencer saw in Nature Struggle and nothing but Struggle, the ruthless Gladiatorial Show with all its tale of death, just where later observers see co-operation even more plainly marked than struggle, love in an Eden rather than fierce fight in a gladiatorial arena, is that the horrors of the French Revolution, and the ghastly bondage of the early English Industrial

Revolution, made the eye quick to see struggle but slow to mark co-operation. Similarly, the conception of life which shows itself in the adage "practice makes perfect," rather than in the alternative adage "genius is born not made," is the conception that determined the line of Lamarckian thinking and found the explanation of differences in the effects of use and disuse. So Geddes and Thomson¹ lay the greatest emphasis upon the social origin of evolution theories. "That the idea of Evolution has originally been projected from the social plane into that of the other sciences," says "Chambers' Encyclopædia," "is a proposition which can only be doubted by the specialist who has not inquired into the history of his ideas. Evolution in social affairs has not only suggested our ideas of Evolution in the other Sciences, but has deeply coloured them in accordance with the particular phase of Evolution current at the time."

Let human affairs, then, from consideration of which the great Darwinian movement sprang, be our illustration of what the process of Evolution, by Natural Selection or by some other as yet unperceived method of conserving germinal variations, is able to accomplish. Although the single or multiple origin of the human race is still under discussion and is in scientific thought an open question, it is probably true that science leans rather toward the monophyletic or single origin: while believers in the Bible maintain, of course, the single origin also. The believers in the Bible should be the last to deny the actuality of a rigidly limited Evolution (Par-

¹ See "Evolution," pp. 247 and 248.

volution), and should most clearly perceive the scope of the evolutionary process as illustrated in the life of Man. For starting, as we hold, with one original pair, the evolutionary process has produced all the endless varieties within the Human Race which we see throughout the world to-day. There is no proof whatever, nor vestige of it, that any earlier distinct type has evolved into the type called Man (*Homo Sapiens*), any more than that from that type itself any other new type has ever been formed. All evolutionary change has been within the type : but how great have those changes been, in every realm, possibly in improvement and certainly in deterioration ! Take Man (*Homo Sapiens*), both in his physical, his mental and his social characteristics. From the first parents of the Human Race have come, in matter of physique, races white, red, brown, yellow, black : races tall, medium, and dwarf : races with the hair of the head fine in texture and gently curling or waving, and races with hair thickly curling and approaching the character of wool : races with brachy-cephalic, and races with dolicho-cephalic skull : races with thick lips and flattened features, and races with thin lips and features aquiline—and so on in long succession the physical differences run. In mental characteristics what large differences have come to be. Place a Greek of the great time when the whole Athenian democracy could be counted on to appreciate at a first hearing a play of *Æschylus*, side by side with an Australian Aborigine : place a Hebrew, with his conception of the One God of Justice, Holiness and Love side by side with a Hindu burdened by his multitude of

mainly horrific deities : place a Greek of the Golden Age just mentioned with his brilliant secular intellect side by side with a Hebrew of the Golden Age of the Prophets, with his penetrating insight and thrilling statement of the Mind and Will of Jehovah ! What vast contrasts ! And these have come to pass by the process called Evolution within the limits of the type called Man. Or take social organization—and contrast Despotism with Democracy, or contrast Democracy with its equal respect for all classes and personalities with Bolshevism of the rigid limitations and the frantic hates, or contrast Monarchy with Oligarchy as two realized orders of Society—and while it is clear that Evolution does not of necessity mean progress, it may and often does mean most striking differentiation. It all takes place within the type : but within the type the Human Race shows, especially to those who believe in the single origin of the Human Species, how vast is the scope of change.

What happens within that fixed type of existence classed as *Homo Sapiens* takes place also within every other type. *How* it takes place is a question as yet very far from being authoritatively answered. Darwin's theories are, as we have seen, for the most part abandoned : and all that the leaders of scientific research will say is that Natural Selection is a *vera causa* as far as it goes ! The very remark is almost scornful in its easy-going acquiescence. The facts from which Darwin turned away as being closely akin to Creation, if, that is, they did indeed constitute the origin of new Varieties, have been carefully studied by De Vries and formulated into a theory

which need not arouse the antagonism of the Creationist, and may prove to embody the main evolutionary process. Prof. Hugo de Vries, Professor of Botany in the University of Amsterdam, seized upon those big Variations ("sports," "single Variations," "discontinuous Variations") from which Darwin had turned away, and contended that in them we may find the secret of evolutionary changes. He terms them "Mutations" or "Elementary Species." They are the large Variations which leap, unheralded and fully made, into existence, or at the least into notice. They remain fixed and breed true from the beginning. De Vries does not question that many Species have undergone vast changes during the course of centuries, and no one knows (presumably because they have not been under observation) whether they have taken place gradually or by leaps and bounds. But he is deeply impressed by the constancy of Species. "The constancy of Species," he says, "is a demonstrated fact; their transmutability is still a matter of theory." And in reply to the Darwinian plea that the immutability or constancy is only apparent and is due to the shortness of the time of our observation and the slowness of the changes, with the true scientific insistence on fact he replies, "This is a mere assumption."

Within Species, taking the word in its broad typal sense, De Vries submits that new Varieties arise by Mutation. Some of his illustrations of the emergence of these new Varieties are full of interest. For instance:—

"About the year 1590 Sprenger, an apothecary in Heidelberg, found in the garden where he grew plants for his

business (amongst which was *Chel. majus*) a new form of *Chelidonium* which differed from *C. majus* in the possession of deeply-cut leaves and petals. He called it *Chelidonia Major foliis et floribus incisis*, and sent some examples to Jean Bauhin, Gaspard Bauhin, Clusius, Plater, and other well-known botanists of his time. All of them declared that the plant was unknown to them and new. It had never been found wild before nor has it ever been found since: although from time to time it has escaped from gardens. It comes absolutely true from seed, has maintained itself till the present day, and is very generally known in Botanical Gardens. Miller, Roze, and many others have tested its constancy by cultures extending over many years and have observed no reversion to *C. majus*. I have repeated the experiments with the same result.

"We may conclude therefore that *C. laciniatum* arose about the year 1590. Unfortunately Sprenger does not say whence the seeds came which gave rise to it, whether from seed saved by himself from *C. majus*, or from some other source. The former is the more probable, since otherwise he would have known from whence he had obtained it." ("The Mutation Theory," pp. 189 and 190.)

Again:—

"Strawberries without runners belong to the species *Fragaria Alpina*, and are known under the name of Gaillon-Strawberries. Forms are known both with red and with white fruits. The history of their origin is recorded by P. P. A. de Vilmorin in the *Bon Jardinier*. He found a single individual bearing this character in a crop of the ordinary *Fragaria Alpina*. The seeds of this individual gave rise solely to plants without runners: the new sort was absolutely constant from the beginning (p. 192).

"The Cauliflower and Kohl-Rabi were raised from isolated monstrosities of *Brassica Oleracea*. The *Chou de Milan des Vertus* likewise arose spontaneously from another sort of cabbage and soon became one of the most popular vegetables in the Paris market." (p. 192.)

Special space is given by De Vries to the Mutations or Elementary Species of the Evening Primrose, *Oenothera Lamarckiana*: from which he grew 50,000 plants, among which, in the course of a few years, no less than seven Elementary Species appeared.

The sudden appearance in the same manner of the Shirley Variety of Poppy will probably impress the general mind even more, inasmuch as it is now so general a favourite. The Rev. William Wilks, who for thirty years was Vicar of Shirley, found, one June morning in 1880, in the corner of a cornfield just outside the Vicarage garden, a wild red poppy with all four petals narrowly edged with white. "I marked the flower and saved the seed-head," he says. "Next year out of 200 plants three or four had white-edged petals. Then, after years of selection, I got flowers of pure white, pale pink and other colours, with golden instead of black centres. These flowers are now to be found growing all over the world, and are known as the Shirley Poppies."

Prof. Bateson and Prof. de Vries are the two leading investigators in the realm of Variation, and in the mystery of Variation the secret of Evolution lies hidden. Prof. Bateson's view of the meaning of Variation is of the highest interest and importance. The progress of his thought from the year 1894, when he published his "Materials for the Study of Variation," on to his Presidential Address before the British Association (Melbourne) in 1914, and then to his definite condemnation of Darwinian Evolution in an address at Toronto, 1922, is full of interest. His tremendous onslaught upon the whole old theory of Variation in the Presidential

Address deserves to be read and closely noted. He declares that he holds to Evolution : but we do not know how it came about and it is doubtful if it is continuing to-day. In our present ignorance, he says, our speculations about origins have no more value than the speculations of the old Alchemists about the origin of the Elements. He believes that scientists began far too soon to form theories, long before the facts had been ascertained. We are as yet too abysmally ignorant to speculate at all : but as facts begin to be ascertained, Variation begins to present itself as "unpacking." Evolution in that case proceeds by the dropping not by the adding of characteristics : its procedure is in such case not from the simple to the complex but from the complex to the simple : and hard as it is, he says, to conceive of the first form of living matter (which he still conceives of as "protoplasm") containing in itself complexity enough to produce all the endless forms of life, yet we "must open our minds to the possibility" that Evolution is from the complex to the simple, and not vice versa as has been heretofore supposed. For example, Sutton's Crimson King Primula gave off a few years ago the Coral King Primula, a salmon-pink variety, by dropping one colour element, and has always bred true. There is no doubt that Variations thus occur, viz. by the dropping of a factor either in whole or in part : but, apart from this Variation by Subtraction, the only other Variation is, he believes, with Lotsy, Variation through crossing. New factors only occur in this latter way. And then he goes on, on pages 20 and 21 of the Address, to enunciate

the possibility, which is steadily asserting itself as the view of sound and careful thinkers, viz. that such Evolution as we to-day can trace has taken place *only within the type* :—

“ Distinct types once arisen, no doubt a profusion of the forms called ‘ species ’ have been derived from them by simple crossing and subsequent recombination. New species may now be in course of creation by this means, but the limits of the process are obviously narrow. On the other hand, we see no changes in progress around us in the contemporary world which we can imagine likely to culminate in the evolution of forms *distinct in the larger sense*. By intercrossing dogs, jackals and wolves new forms of these types may be found, some of which may be species ; but I see no reason to think that from such material a fox could be bred in indefinite time or that dogs could be bred from foxes.”

Thus it is admitted that *we do not know* how distinct forms in the larger sense which I have called distinct types, originated ; and Bateson, a really eminent investigator as distinct from an exponent of other men’s conclusions (even Huxley, for example, called himself “ Darwin’s bull-dog ”), declares our ignorance to be too great to admit so much as an evolutionary *theory* of such origins. His own profession that he still holds to the theory of Evolution and still traces all forms of life back to “ protoplasm ” merely shows the bias of his mind toward the Doctrine of Descent, and is exactly to be described, with apologies for the entirely improper adjective, as a “ pious opinion.” No mere expression of pious opinion can weigh with us as against the reasons which have led us to discard the Doctrine of Descent as unproven. But *within*

the type changes manifold are taking place. Bateson and De Vries both admit that the known changes are taking place there and there only; and De Vries propounds the Mutation Theory, with which, in the sense that factors are sometimes in whole or in part mysteriously and suddenly dropped, Bateson agrees. The position resolves itself into this: that to-day Evolution can only be traced within the type, the occasioning cause being either crossing, or else Mutations which we are not able to explain, but may perhaps describe as the dropping of a factor from the constitution of the parent.¹

It is a vastly different conclusion from that which had been reached, say, in the eighties of last century. Then it was concluded that the mystery of the Universe had been fathomed and the chief secret of Life laid bare. Science heard herself chanting a mighty Epic, at once History and Poesy, covering all the course of Time. To-day she can only hear herself move haltingly through the pages of one brief chapter of that History. The Mighty Orchestra which filled all space has fallen into silence, and now only the homely shepherd plays for us a melody upon his flute. "The centuries follow one

¹ "The appearance of contemporaneous Variation (Prof. Bateson means thereby the supposed abounding mass of chance fluctuating Variation) proves to be an illusion. Variation from step to step in a series must occur either by the addition or the loss of a factor. Now, of the origination of new forms by loss there seems to me to be fairly clear evidence, but of the *contemporary acquisition* of any new factor I see no satisfactory proof, though I admit there are examples which may be so interpreted." (Bateson, Presidential Address, Brit. Assoc.)

another, perfecting a small wild flower." But this is true music ; and the Mighty Orchestra was both pretentious and barbaric in its theme. Or to vary the figure yet again, let us say that fifty years ago a strange glamour fell upon the Scientist, who turned Poet and saw the Universe as in an enchanted dream. To-day, the glamour past and gone, he sees some limited spaces of the Earth with eyes grown clear—and begins to marvel at the dream.

The fact is that, beside Creation, there is not even a theory of Origins to hold the field to-day. There is nothing to even contest the affirmation of a Creation whose typal forms still remain, and are the basis of the multitudinous Varieties existing at the present time. Creationism does not postulate a static world. There is constant movement within Species. Perhaps, as the Theory of Mutation suggests, and the so-called "Neo-Darwinians" are inclined to believe, at a given moment, after periods of quiescence, the entire Species is moved by a force that makes for Variation. Or perhaps there is no such periodicity. It is not a matter of any great moment. Periodic or not, we have no knowledge of any Variations that change the type ; and Variation within the type is in no sense contrary to the Creationist position. "My Father worketh even until now, and I work," was the declaration of Jesus Christ. To the Rev. Dr. Erich Wasmann belongs the credit of having perceived years ago the real conclusion to which the mighty outburst of research initiated by Charles Darwin is actually leading. He affirmed that a distinction must be made between what he called "Systematic Species,"

i.e. the Species of the ordinary classifications, which are very numerous, and "Natural Species," each of which includes many of the "Systematic Species" within itself: and he maintained that while the Systematic Species have arisen by descent from within the Natural, we are shut up to the theory of the direct Creation of the Natural Species, of which there is at the close of the long investigation no other conceivable origin. When we carefully distinguish the pious opinions of the great leaders of scientific investigation from their definite and very moderate affirmations, we realize that all need to fear the destructive influence of that rigidly limited Evolution, which alone is proven, upon Christian Biblical Theology has passed away. This does not, of course, apply to the contentions of the "camp-followers," such as the writers of schoolbooks and the theologians—who still imagine Darwinism to be the dominant biological theory, and the Doctrine of Descent to be accepted by all intelligent men. These are living in a past generation of scientific thinking, and that makes them dangerous.

But the true leaders realize that the mightiest assault which Research ever made upon the strongholds of ignorance and the greatest outburst of Thought which human history records have reached their halting-place. Admittedly they can proceed no further until an accumulation of Facts offers material for theory and paves the way for understanding. Meantime the outstanding result has been to place upon a strong philosophic basis the Record of Creation—as an ancient account of Origins, capable of furnishing a reasonable explanation, closely akin

to that Mutation Theory of the origin of Varieties within the Species which grows in strength to-day, and holding the field securely because there is no contestant.

APPENDIX

THE BLOOD-REACTION " PROOF " OF BLOOD-RELATIONSHIP

Very strong statements are made respecting this line of investigation.

Profs. Geddes and Thomson (" Evolution," pp. 63 and 64) says: " Various workers—Friedenthal, Ulhenhuth, and Nuttall—have brought forward experimental evidence of blood-relationship, and this in the most complete and literal sense. Friedenthal points out that when the blood of a horse is transfused into an ass, that of a hare into a rabbit, or that of an orang into a gibbon, or that of a man into a chimpanzee, there is a harmonious mingling of the two. But when human blood is transfused into eel, pigeon, horse, dog, cat, lemur, or non-anthropoid ape, there is no harmonious mingling. The human blood-serum behaves in a hostile way to the other blood, causing great disturbance, marked for instance by the destruction of the red blood corpuscles."

Prof. Schwalbe (" Darwin and After Darwin," p. 129) says: " Ulhenhuth, Nuttall and others have established the fact that the blood-serum of a rabbit which had previously had human blood injected into it, forms a precipitate with human blood. . . . But added to the blood of an anthropoid ape (it) gives *almost* as marked a precipitate as in human blood; the reaction to the blood of the lower eastern monkeys is weaker; that to the western

monkeys weaker still ; indeed, in these last cases there is only a slight clouding after a considerable time and no actual precipitate. The blood of the Lemuridæ (Nuttall) gives no reaction or an extremely weak one, that of the other mammals none whatever (*sic*). We have in this not only a proof of the literal blood-relationship between man and apes, but the degree of relationship with the different main groups of apes can be determined beyond possibility of doubt."

Prof. W. B. Scott ("The Theory of Evolution," pp. 73 to 81) says, in the course of a whole-hearted acceptance of the conclusive character of blood tests, that they "come as near to giving a definite demonstration of the theory of Evolution as we are likely to find."

But an examination of the book of Prof. Nuttall, Lecturer in Bacteriology and Preventive Medicine at Cambridge, produces a very different impression. First, in contrast with the certitude of the above quotations there is a general modesty about Prof. Nuttall's statements. A long section, pp. 72 to 87, is given to "Sources of Error in Precipitin (i.e. Blood-reaction) Tests." Moreover, his own summary of the position is : "In view of the crudity of our methods it is not surprising if certain discrepancies may be encountered in the course of investigation conducted by biological methods ; the body of evidence is, however, perfectly conclusive. The object of my investigation has been to determine certain broad facts with regard to blood affinities, consequently my studies must be regarded in the light of a preliminary investigation which will

have to be continued along special lines by many workers in the future" ("Introduction").

Nuttall's reaction test appears to be as follows: If a serum (i.e. the watery portion of the blood, remaining after coagulation) from the blood of one animal be injected into the veins of another, a "precipitin" or "anti-serum" can be obtained from the blood of the latter: and when this anti-serum is added to various kinds of blood, those akin to the blood from which the serum for injection was taken react by clouding and giving a "precipitum" or deposit. Under the heading "Tests with Anti-human Serum" Nuttall describes how he obtained five different anti-sera by treating rabbits with human blood; and the *Qualitative Table* of results (p. 165)—in which he gives reactions of five degrees, viz., nil, minute, medium, above medium, and full—embodies his most striking results and is illuminating. I summarize the results under three heads:

1. Among the animals tested were 49 reptiles, 19 fishes, 14 amphibians, 7 crustaceans (i.e. crabs, etc.), 1 monotreme (a very low Australian Mammal, e.g. duckbill), and 2 *Lemurs*—these last being related to the Ape tribe. Yet all these were alike in giving no reaction at all! The Lemur should certainly have revealed its difference from the Crab!

2. Some of all the rest of the species tested gave *some* reaction, generally only slight. This should, if the qualitative tests are of any real value, mean that all the rest of the species tested have some degree of relationship, and all of them more relationship to Man than has that relative of the Ape, the Lemur, which gave no reaction.

3. 97 Primate bloods were tested, viz.:

34 Human. All reacted; 3 medium; 7 above medium; 24 full.

8 Simiadæ (the family of anthropoids, consisting of gorilla, chimpanzee, orang and gibbon). All reacted in full.

36 Cercopithecidæ (a family inc. all Old World monkeys except Simiadæ). 3 gave nil; 26 medium; 3 above medium; 4 full.

13 Cebidæ (a family inc. all New World monkeys except Marmosets). 3 gave no reaction; 2 faint; 5 medium; 3 above medium; none full.

4 Hapalidæ (Marmosets). 2 nil; 1 faint; 1 medium.

2 Lemurs. Both nil.

Yet at the same time of 97 Carnivores (flesh-eating animals) 13 gave a faint and 14 a medium reaction; thus being akin to Man not so much as the Marmosets but more than the Lemurs; of 65 Rodents (the order inc. rats, mice, squirrels, rabbits, porcupines) 7 gave a faint and 5 a medium reaction; of 70 Ungulata (the order inc. ox, sheep, goat, horse, pig, tapir) 19 gave a faint and 11 a medium reaction; while 3 Cetacea (the order inc. whale, dolphin, porpoise) all gave a faint reaction.

Thus, if similarity of blood proves relationship, we must believe that while Man and the anthropoid are closely akin, Carnivores, Rodents, Hoofed Mammals and the Whales tribe are all in measure related to one another, and are all more akin to Man than that cousin of the apes, the lemur. These results at the very least are *peculiar*.

But Nuttall also gives the results of *Quantitative*

Tests (pp. 319 and 320, etc.) in which he measured the amount of precipitum or deposit produced by the various bloods tested. The results are *exceedingly* peculiar. He records three tests, using "Anti-primate Sera," obtained by treating a rabbit with human blood. About these quantitative tests he says later (p. 409): "The degree and rate of blood-reaction appear to offer an index of the degree of blood-relationship; in other words, closely-related bloods react more powerfully (more precipitum) and more rapidly than do distantly related bloods, provided the latter react at all." So *the test is the amount of deposit*, if any.

In the first test all the Primates (the order inc. Man and the apes) gave a large deposit, Man's being the standard, viz., 100 per cent., and they ranged from the chimpanzee, 130 per cent., down to the spider-monkey, 29 per cent. But the jackal, otter, ox and sheep all gave 10 per cent., the antelope 7 per cent. and the Tibetan bear 7 per cent. If these tests show *real* results, then otter, jackal, sheep ox, etc., bear some relationship to Man!

In the second and third tests, the deposit from Man's blood being put in each case at 100, the anthropoid orang-utang was 47 and 80; one species of baboon was 30 and 50; another species of baboon was 61 and 70; while a short-tailed Old World monkey (*Macacus Rhesus*) was 72 and 90. What conclusion can be clearer than that one species of baboon is *as* closely related, and *Macacus Rhesus* *more* closely related, to Man than is the anthropoid? The quantitative and qualitative tests disagree.

Moreover, two tests with "Anti-pig Serum,"

obtained by injecting pig blood into a rabbit, give results more peculiar still. The actual proportion of deposit is given in decimals. In the first, the ox and the sheep gave the same amount as the baboon, viz., .004; while the whalebone whale, one species of baboon, the tiger, the African antelope, and *Man* all gave the same also, viz. .003. Surely a *reductio ad absurdum* of the whole theory! (pp. 328 and 329).

In the second test, the anthropoids, viz. chimpanzee and gorilla, and the horse all gave the same amount, viz. .012; and *Man*, the civet cat, and the little Madagascan mammal called the tenrec all gave .011 (p. 330). What curiosities of relationship are here revealed! Even Prof. W. B. Scott has to admit: "It could hardly be maintained that an ostrich and a parrot are more nearly allied than a wolf and a hyena, and yet that would be the inference from the blood tests" (p. 79 above). The quantitative tests show that *Man*, the civet cat, the baboon, the tenrec, the whale, the tiger, the African antelope, the horse, the sheep, the chimpanzee and the gorilla are all included in a quite unsuspected family relationship! It certainly seems to prove a great deal too much!

The fact is that, along with deep-seated differences between bloods, there are general similarities as well. The same materials are present in most or all, and the same life-processes have been at work. Similar blood reactions are therefore to be expected on almost all hands, and Nuttall's experiments simply show that in general they are to be found. Their absence would be difficult to explain. What

are also difficult to explain are the affirmations that in the blood tests we have definite proof of Evolution and of the descent of Man.

The suggestion has been made that the resemblance between human and animal blood, particularly in the case of the anthropoids, may be due to the crossing of human and animal strains (cf. Lev. xviii. 23-30, and similar passages); and it is urged in this connection that there are rare cases in which crossing of alien strains has resulted in permanently fertile offspring. But it is doubtful if any similarity exists which demands such an explanation.

Ultra-microscopical examination of human and all animal blood has revealed difference of structure in the red blood corpuscles. No doubt this matter will be pursued: and meantime all that these blood-reaction tests prove (*if indeed they prove anything*) is blood similarity: *and similarity does not involve relationship*. It amounts to just this: that the blood of certain Primates and other mammals share certain chemico-physiological properties. But chemical resemblance and identity of origin are quite distinct. "If anyone," says Wasmann ("Modern Biology," p. 458), confuses these two ideas by skilful jugglery, the blood-relationship between Man and the chimpanzee may indeed appear to be proved; but only to an uncritical public. The proof will be logically convincing only if it has been previously demonstrated that a similarity in the chemical reaction of two kinds of blood depends solely upon the existence of direct blood-relationship between the animals possessing this blood, and no one can maintain this to have been established. . . .

According to Friedenthal's own experiments, the blood of . . . the common crab, or that of a lug-worm, did not destroy the red blood corpuscles of a sea-mew or a rat; but surely no one would infer that for this reason rats must be directly descended from lug-worms, or sea-mews from crabs." Moreover, Brumpt has shown that Sleeping Sickness, which is conveyed by parasites in the blood, called trypanosomes, can be produced in all mammals by inoculating them with the blood of a sufferer—the only exceptions being a few apes and the pig (" *La Nature*," April 28, 1906, p. 339). " As this inoculation involves a reaction just as much as the experiments in blood-relationship, we should have to infer from these results that human blood is ' less closely related ' to that of apes and pigs than to that of other mammals " (Wasmann, p. 461).

The conclusion is very certain. The statements of Geddes, Thomson, Schwalbe, etc., bear little relation to the facts revealed by the investigations. Two utterances of Friedenthal warn us that we must scrutinize very carefully the verdicts of evolutionary enthusiasts to-day. Friedenthal once declared: " We are not merely the descendants of apes; but we are genuine apes ourselves." Yet the same man, in a discussion following some lectures by Wasmann in Berlin (see " *Modern Biology*," p. 503) also declared that in using the word blood-relationship he never meant more than blood resemblance in a chemico-physiological sense, and energetically protested against having the idea that blood-relationship means actual kinship imputed to him !

INDEX

Abbreviations :

E. = Evolution.
D. = Darwinism.
S. = Species.
N.S. = Natural Selection.

V. = Variation.
Vs. = Varieties.
T. = Transmutation.
C. = Classification.

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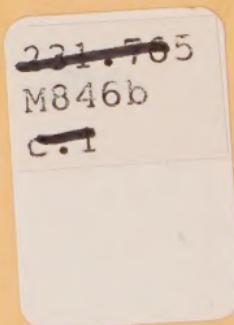
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